COOPER NUCLEAR STATION

DETAILED CONTROL ROOM DESIGN REVIEW

SUPPLEMENT TO THE SUMMARY REPORT

SUMMARY

This report documents Nebraska Public Power District (NPPD) response to the Nuclear Regulatory Commission (NRC) concerns and recommendations resulting from their in-progress audit of the Detailed Control Room Design Review (DCRDR) program at Cooper Nuclear Station (CNS) on November 27-29, 1984, and their review of CNS DCRDR summary report submitted to the staff on February 4, 1985.

The report format lists each of the DCRDR task requirements identified in Supplement 1 to NUREG-0737, NRC assessment of CNS work performed to the date of issue of the summary report (February 1985), NRC request or recommendation for action to complete the task, NPPD response to this request identifying the additional work performed to date and actions planned to bring this item to conclusion.

The major areas addressed in this report, beyond what is described in the summary report, are:

- Inclusion of instrument operability requirements and indicator accuracy requirements in the Function and Task Analysis (F&TA) of the revised EOPs.

- Plans for extending the F&TA to normal procedures used in the EOPs and to other emergency procedures still in use after the EOPs have been implemented.

- Review of existing control room survey, and assessment of these Human Engineering Observations (HEOs) item-by-item.

- Documentation of the Human Engineering Discrepancies (HEDs) in sufficient detail to enable non-DCRDR members of the team to address the HEDs and implement the design changes.

- Description of NPPD process for development of enhancements and design modification of the HEDs, and verification of their corrections and implementation.

- Description of CNS plans for integrating NUREG-0737 programs of the SPDS, DCRDR, EOP, R.G. 1.97, ERF, operator training, and the interfacing tasks among these programs.

Details of these items and other related tasks are identified in this report.

NPPD has setup a DCRDR organization to deal with the program functions on both the technical, managerial and administrative levels. The DCRDR program has been organized under 1) CNS operations with support from General Electric Company (GE) engineering and their Human Factor (HF) consultant, and 2) NPPD engineering with support from Black & Veatch (B&V) engineering. The two organizations meet on a regular basis, and interface on various aspects of the program. Details are given in this report.

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APPENDIX

INTRODUCTION

In response to the NRC action plan resulting from TMI-2 accident (Ref.1), and the follow-up clarifications of NUREG-0737, Supplement 1 (Ref. 2), NPPD has submitted its plan (Ref. 3) for implementing NUREG-0737 related programs.

In accordance with the implementation schedule for the DCRDR, NPPD submitted Cooper program plan for conducting the detailed DCRDR (Ref. 4). The DCRDR program plan described the methodology and documentation the District intends to follow to meet the NRC guidelines of references 5, 6 and 7. The NRC approval of NPPD program plan was received on June 1984 (Ref. 8).

On November 27 - 29, 1984, the NRC staff and contractor personnel from Lawrence Livermore National Laboratory, conducted an on-site in-progress audit of CNS DCRDR, Ref. 9. Prior to the receipt of the staff written comments on the in-progress audit, NPPD issued the DCRDR summary report on February 1985, as scheduled, Ref. 10.

The NRC review of CNS DCRDR summary report and the Technical Evaluation Report (TER) provided by the NRC contractor (Ref. 11 and 12), were issued in September 1985. Prior to this date, the NRC in-progress audit report (Ref. 9) was fowarded to the District on April 1985. A number of concerns and recommendations were identified in these reports. In a letter to the staff, dated April 1985 (Ref. 13), NPPD stated that a summary report supplement addressing NRC concerns of References 9, 11 and 12 will issued by February 1986.

This report provides the documentation of the work performed by NPPD to address the staff concerns and recommendations stated in references 9, 11 and 12. The report addresses each of the issues raised in these references, NRC assessment of the issue, and the request or recommendation for action, and lastly, NPPD resolution of the issues.

1.0 DCRDR REVIEW TEAM

REQUIREMENTS: Establishment of A Qualified Multidisciplinary Review Team.

NRC ASSESSMENT/ REQUEST: NPPD has adequately complied with the DCRDR team requirements of NUREG-0737, Supplement 1, Reference 11, P.2.

NPPD RESPONSE:

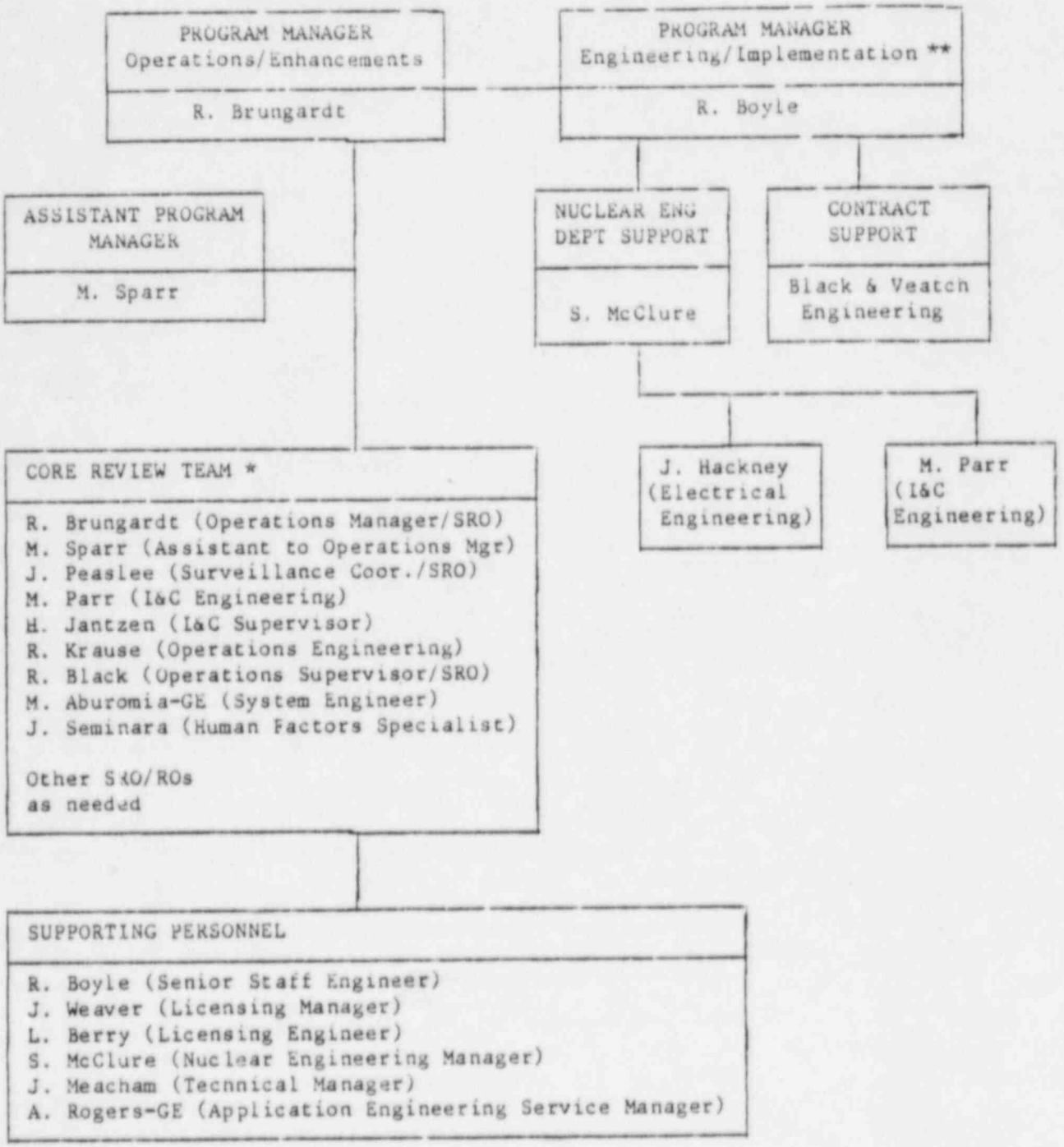
In performing the DCRDR supplemental tasks identified in various sections of this report, NPPD has maintained the same DCRDR core structure as stated in the summary report (Ref. 10). The existing team consists of:

- The station operations manager, and the assistant to operations manager.
- A senior reactor operator, who is presently CNS surveillance coordinator.
- A senior systems engineer from General Electric.
- A human factors specialist, as a consultant to General Electric.

In addition to the above individuals, personnel involvement has been enlarged to meet the program's overall objectives. Personnel with expertise in controls & instrumentation, program management, design engineering, plant operation, equipment installation and program licensing have been added to the program. Figure 1.1 shows the DCRDR team structure and their overall responsibilities under the Operations/ Enhancements and Engineering/Implementation subdivisions of the DCRDR program. The two teams interface on a regular basis. They hold a formal meeting in the 1st or 2nd week of each month at Cooper Nuclear Station.

FIGURE 1.1

DCRDR PROGRAM STRUCTURE AND PERSONNEL



* CORE REVIEW TEAM RESPONSIBILITES

- HED Identification
- Resolution of Enhancement/Modifications
- Development of Integrated Conceptual Drawings
- Verification of HED Corrections

**ENGINEERING/IMPLEMENTATION RESPONSIBILITIES

- Detailed Design Engineering of HEDs
- Development and Updating of Control Panel Drawings
- Development of Implementation Plan and Schedule
- Implementation of HED Corrections

2.0 FUNCTION AND TASK ANALYSIS

NRC ASSESSMENT: The effort conducted to date, when supplemented with the information as described in the enclosed TER will satisfy the NUREG-0737, Supplement 1 requirements, Reference 12, P.3. NPPD's analysis should be supplemented as follows to resolve these concerns, Reference 11, P.4.

REQUIREMENTS: 2.1 Definition Of Instrument Operability Requirements Under Accident Conditions.

NRC REQUEST: Define requirements for operability under accident conditions (e.g., power quality and qualification of portions of the instrument and control loops located in harsh environments), Reference 11, P.12.

NPPD RESPONSE:

In its response to CNS DCRDR program plan (Ref. 8), the NRC defined acceptable guidelines for conducting the function and task analysis (F&TA) information and controls needs/characteristics requirements as:

- Define the information necessary (e.g., parameter, value, status) for the operators to determine the need to perform the task, the control capabilities needed to perform the task and the information necessary to determine that the task has been performed successfully. (Note that no instrumentation has been identified yet; only operator needs derived from the task.)

- Analyze the operator needs (from above) to determine the characteristics of the information and control capability needed to perform the task. Information characteristics include parameter type, dynamic range, setpoints, resolution/accuracy, speed of response, units, and the need for trending, alarming, etc. Control characteristics include type (discrete or continuous, rate, gain, response requirements, transfer function, locking functions, and information feedback associated with control use).

NPPD in their summary report (Ref. 10), presented a human factor engineering model that meets the above criteria, and simulates operators needed information and instrument requirements/characteristics. This model is shown in Fig. 2.1, where four key steps are identified.

EOP Phase		Control Room Needs
o Alerting	-	Annunciators
o Information	-	Indicating Meters
	-	Recorders
	-	Indicating Lights
o Initiating Actions	-	Switches (Pumps, Valves and Relays)
	-	Performing Calculations
	-	Communication Equipment
o Controlling Actions	-	Controllers

For each of the CR hardware needs, specific engineering and human factors characteristics are required for the operator to correctly identify and execute the EOP steps. The characteristics are dependent on the hardware instrument, associated operator action, and the human factor interface with the instrument. Figure 2.1 gives the engineering characteristics of instruments considered in the DCRDR task analysis. As noted, operability requirements of the instrument, under accident conditions, were included as additional characteristics needed to perform the task. The specific human factors characteristics for operator interface with the instrument were identified in the summary report, and are included in Table 2.1 for reference purpose.

The design and qualification criteria for identifying the instrument operability requirements under accident conditions depend on the instrument function, and the operator interface with the instrument to perform this function as noted in Figure 2.2. This criteria is defined in terms of analogous criteria of instrument categories used under the R.G. 1.97 program (Ref. 14, 15) or under the Reactor Protection System (RPS) description, Ref. 16. The design and qualification criteria requirements against instrument functions, noted in Figure 2.2, are:

Design & Qualification Criteria		Instrument Function/ Operator Interface
1) Category 1/or RPS and Redundant Displays	o	Rx Scram,
	o	Rx Isolation, Or
	o	Primary Containment Isolation
2) Category 2	o	Alerting Operator to Emergency, Or
	o	As a Primary System For Event Mitigation & Control
3) Category 3		All Other Functions and Operator Steps.

Table 2.2 gives the design and qualification criteria for instrument categories (Ref. 14). The RPS design criteria and qualification criteria are given in Reference 16. The RPS criteria meets the IEEE 279 design requirements with respect to power supply, equipment qualification, seismic requirements, QA and channel availability, Ref. 17.

For each of the entry conditions and the EOPs operator actions listed in the task analysis data sheets, the needs and characteristics of information and controls, including the operability requirements of the instruments, were completed in advance of conducting the CR task analysis walk-through. These values were entered in the 3rd column of the task analysis data sheets, as noted in Appendix A, under Controls and Information Needs/Characteristics. Comparison of information and control requirements with control room inventory is discussed under section 3.0 of this report.

TABLE 2.1-A

DCRDR TASK ANALYSIS

HUMAN FACTOR CHARACTERISTICS OF INFORMATION AND CONTROLS
(OPERATOR ACTION PHASE)

Operation Action Code	Description
RV -	Read Value - Procure readout of display
CR -	Check Read - Readout approximate value, direction of movement (increasing, decreasing), pointer position (above, below)
OC -	Operate Control - Rotary switches, pushbuttons, potentiometers, controllers
MN -	Maintain a parameter. Co-ordinated use of controls and display in order to obtain a desired system value
RT -	Read text - Read legend lights, tiles, or printouts
CL -	Calculate - Perform mental or written arithmetic
DT -	Determine trend - Review history of parameter
CN -	Communication - Transfer of information between operators
DI -	Determine Indicator lamp status
RA -	Respond to alarm

TABLE 2.1-B

DCRDR TASK ANALYSIS

HUMAN FACTOR CHARACTERISTICS OF INFORMATION AND CONTROLS

(INFORMATION AND CONTROL PHASES)

Operator Action Code	Instrument - Checked Items
DT -	Is a chart recorder or printout available? (A meter is a poor display for establishing a long term trend of more than 10 seconds) (see RV or CR for assessment)
CN -	Communication between whom, how. Equipment availability, quality, response time (System load)
DI -	Indicator size, brightness, color, ID., Number of indicators in cluster
RA -	Auditory - loudness, tone (can it be heard over the ambient noise) Visual - Brightness, flicker, color size (Auditory is superior to Visual for alarm)

TABLE 2.1-B (Cont)

DCRDR TASK ANALYSIS

HUMAN FACTOR CHARACTERISTICS OF INFORMATION AND CONTROLS

(INFORMATION AND CONTROL PHASES)

Operator Action Code	Instrument - Checked Items
RV -	Digital Meter - Parameter presented, size readability, ID
	Meter - Parameter, Direction of Movement, Range Scale intervals (1,2,5,5x,10,10x), Readability, ID
	Chart Recorder - Number of Pens, Scale, Color of ink, Range, Size of Paper, Separation of Recordings.
CR -	Meter - Parameter, Direction of Movement, Range, Limit Marks (Set Points), Readability, Scale intervals, ID
	Chart Recorder - Same as RV plus limit marks
OC -	Discrete - No. of positions, grasp, Feedback of position, accessability, vulnerability, ID, force (feel)
	Continuous (Potentiometers) direction of motion, position feedback, force (feel) grasp, accessability, vulnerability.
	Controller - Mode indication
MN -	All the above plus grouping of units for co-ordinated action, response, tune
RT -	Annunciator tiles, Readability, Information content, color flicker, brightness, (General identifiability)
	Legend Light - Readability, Information Content, Color, ID, Number of lights in cluster
	Printout - No of items on page, format readability
CL -	Can calculation be performed by system? If not, are work sheets available? Is work space available?

TABLE 2.2
R.G. 1.97 CATEGORIES
DESIGN AND QUALIFICATON CRITERIA FOR INSTRUMENTATION

		Catetory 1	Category 2	Category 3
1.	EQ Requirements	Reg. Guide 1.89	Reg. Guide 1.89	None
2.	Seismic Requirements	Reg. Guide 1.100	None	None
3.	Redundancy Requirements	Two Channels Reg. Guide 1.75	None	None
4.	Power Requirements	Standby Power	Highly Reliable	None
5.	Channel Availability	Available Prior To Accident	Out-Of-Service Based on Tech. Spec.	None
6.	QA Requirements	10CFR50 'B'	10CFR50 'B' or less dependeing on importance to safety	High Quality
7.	Control Room Display Requirements	1) Continuous Display 2) Recorder for one channel (min) 3) If immediate trend information is essential for operator information, then we need a recorder for each channel	1) Display on Demand 2) Effluent and area monitors need a recorder 3) If immediate trend information is essential for operator information, then we need a recorder for each channel	Same as Category 2
8.	Range	Overlapping of range required if more than one instr. needed to cover range.	Same as Category 1	Same as Category 1
9.	Equipment Identification	Types A,B and C Instrumentation Identified with Common Designation on Control Panels	Same as Category 1	None
10.	Human Factors	Human Factor Review Of Instr. and Analysis to Determine Type and Location of Display	Same as Category 1	Same as Category 1

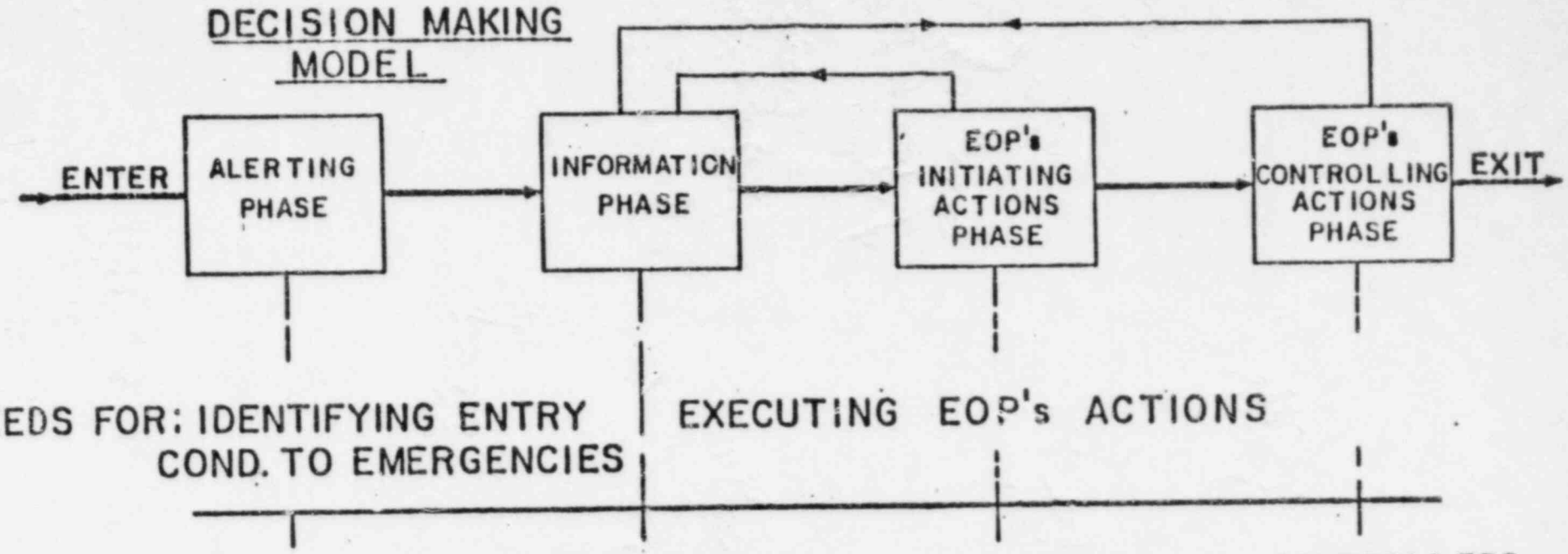


FIG. 2.1 DCRDR TASK ANALYSIS, INFORMATION AND CONTROLS NEEDS/CHARACTERISTICS IDENTIFICATION

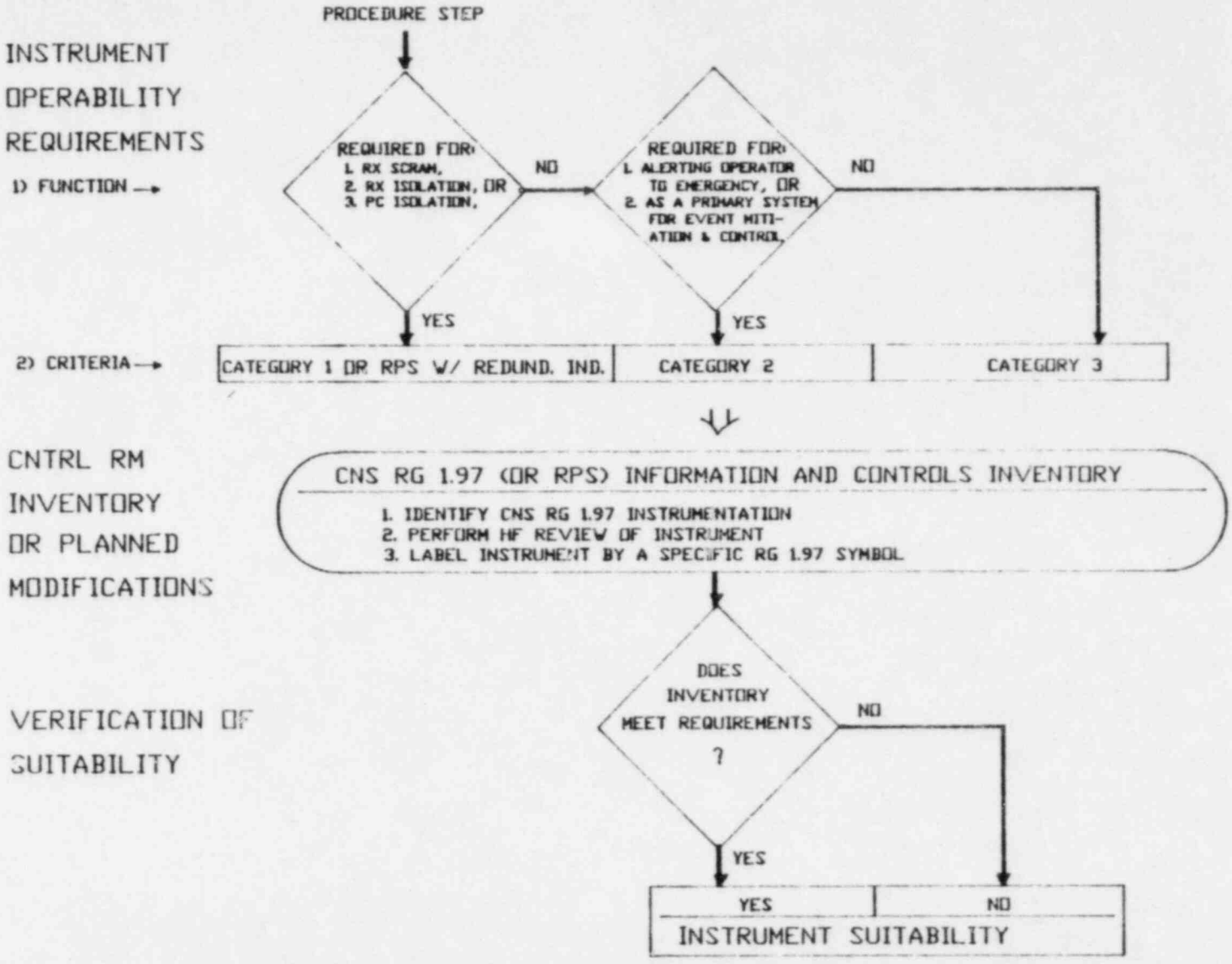


FIG 2.2 INFORMATION AND CONTROLS OPERABILITY REQMTS/INTEGRATION WITH RG 1.97

REQUIREMENTS: 2.2 Identification of Indicator Resolution

NRC REQUEST: Identify requirements on indicator resolution for tasks that require the operator to determine the value of a parameter or compare the value of a parameter against an action, control, or caution point, Reference 11, P.12.

NPPD RESPONSE:

The process the DCRDR team has used in determining indicator accuracy requirements, is shown in Figure 2.3. The process consists of the following steps.

a) For each of the procedure steps that require the operator to determine, the value of a parameter or to compare the parameter's value against an action, control, or caution point, the accuracy value associated with the parameter is identified as an instrument requirement. It is entered as control and information characteristics in column 3 of the task analysis A-sheets in Appendix A. These accuracy values, obtained from references 18 and 19, are for the plant in abnormal operating conditions, and therefore, they are ofter higher than those associated with the narrow band of plant normal operation.

b) For each of the indicators used in determining value of the parameter, the instrument loop accuracy value is entered in column 5 of the task analysis B-sheets in Appendix A. these loop accuracy values represent the commulative instrument built-in inaccuracies of the loop components due to instrument drift, inaccuracy, and resolution. Instrument loop accuracies are often specified in the instrument data sheets and provided to the plant by the instrument supplier (Ref. 20).

c) For each of the steps associated with indicator accuracy, the accuracy requirement used in the DCRDR F&TA is conservatively taken as the minimum of the two values specified in steps a) and b) above. This minimum (or required) indicator accuracy value is entered in column 6 of the task analysis B-sheets of Appendix A.

This process is used throughout the F&TA on the EOPs, as noted in the task analysis sheets of Appendix A. Comparison of the required accuracy against the As-Is indicator accuracy, together with the verification of instrument suitability is discussed in Section 3.0 of this report.

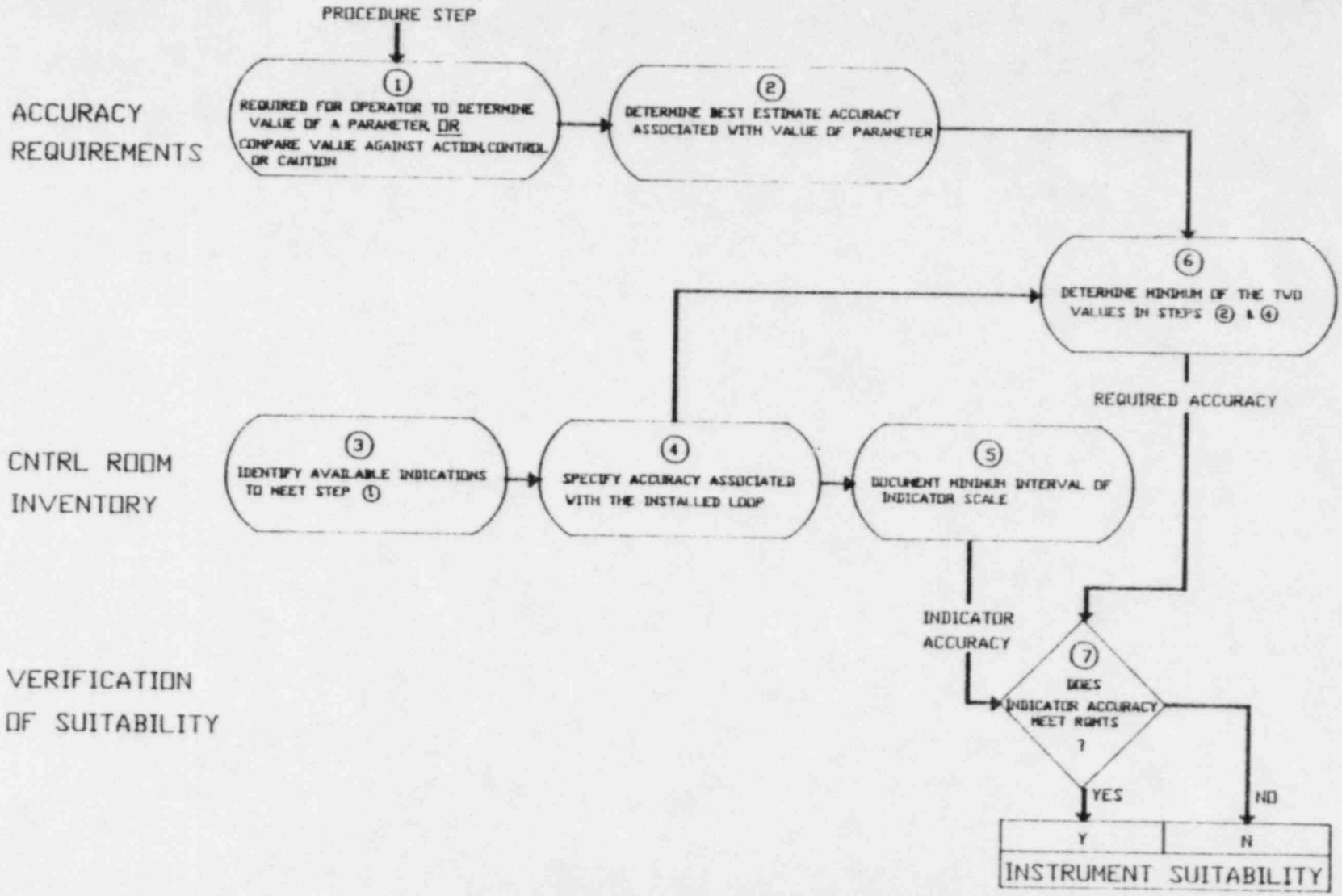


FIG 2.3 INDICATOR ACCURACY REQUIREMENTS/VERIFICATION OF SUITABILITY

REQUIREMENTS: 2.3 Consistency of Maintaining Level of Details

NRC REQUEST: The level of detail in which required information and control characteristics are defined should be consistent throughout the analysis, Reference 11, P.4.

NPPD RESPONSE:

In updating the F&TA on the newly implemented EOPs (Section 2.6) and incorporating instrument operability requirements (Section 2.1) and indicator resolution requirements (Section 2.2), all details of the F&TA were included in the F&TA data sheets (A and B sheets). Each of the entry conditions to emergency, operator steps and cautions listed in the EOPs, are entered in separate sheets that allow for inclusion of all necessary details on the same sheet. (Refer to Appendix A for viewing the task analysis sheet format & contents).

Details of the F&TA requirements in terms of the controls and information needs/characteristics, as identified in Fig. 2.1, for the annunciators, indicators, controls and controllers are placed in the 3rd column of the task analysis sheet as noted in Appendix A. Human Factor requirements associated with each of the steps are identified in column 4 of the task analysis sheets under Operator Action Code (OAC), listed in Table 2.1. Control room inventories are given in sheets 1A and 1B for each of the entry steps. Suitability verification of the instruments and documentation of the difficiency are also noted on the sheets (Refer to Appendix A)

All the F&TA details noted above are maintained consistently through the analysis. Appendix A gives the controls and information F&TA sheets for portions of the Reactor Control section of the EOPs. The remaining sections of the EOPs are following the same format as of Appendix A.

REQUIREMENTS: 2.4 Performance of F&TA on Normal Procedures.

NRC REQUEST: The Licensee should complete that part of the F&TA on Normal Procedures implicitly referenced in EOPs that are required to support performance of EOPs, Reference 12, P.3.

NPPD RESPONSE:

The Function and Task Analysis (F&TA) performed on CNS EOPs will be extended to the plant normal (or abnormal) operating procedures referenced in the EOPs. These procedures, listed in Table 2.3, consist of:

- Normal Shutdown and Scram Recovery Procedures, Series 2.1 (4 Procedures)
- System's Operational Procedures, Series 2.2 (16 Procedures)
- Event Related Procedures, Series 2.4 (2 Procedures)
- Manual Control Rod Insertion Procedures, Series 4.3 (1 Procedures)

Details of the F&TA of these procedures will follow the steps identified in the DCRDR summary report (Section 3.2 of Ref. 10), and the supplemental F&TA identified in Section 2.1 and 2.2 of this report. Human engineering discrepancies (HEDs) resulting from this task will be assessed for safety significance, and the corrections will be included in the final design modifications outlined in section 6 of this report.

TABLE 2.3

EXTENSION OF TASK ANALYSIS TO
STATION OPERATING PROCEDURES (OPs)
REFERENCED IN THE EMERGENCY OPERATING
PROCEDURES (EOPs)

List of OPs Referenced in EOPs

Procedure Number	Title
2.1.4	Normal Shutdown From Power
2.1.6	Scram Recovery During Startup
2.1.7	Scram Recovery During Power Operation MSIVs Open
2.1.8	Scram Recovery During Power Operation MSIVs Closed
2.2.7	Condensate Storage And Transfer System
2.2.9	Core Spray System
2.2.28	Feedwater System
2.2.33	High Pressure Coolant Injection System
2.2.40	HVAC Drywell Cooling
2.2.47	HVAC Reactor Building
2.2.54	Low Pressure Coolant Injection (Mode Of RHR)
2.2.55	Main Condenser Gas Removal System
2.2.58	Augmented Off Gas
2.2.66, Sect. VII.E	Reactor Water Cleanup
2.2.67	Reactor Core Isolation Cooling
2.2.69	Residual Heat Removal System
2.2.73	Standby Gas Treatment System
2.2.74, Sect. VII.I	Standby Liquid Control System
2.2.75	Steam Sealing System
2.2.77	Turbine Generator
2.4.2.3.1	Relief Valve Stuck Open
2.4.4.1	Inadvertent Initiation Of CSCS
4.3, Sect. VII.E	Reactor Manual Control System

REQUIREMENTS: 2.5 Performance of F&TA on Plant Emergency Procedures

NRC REQUEST: The licensee should complete that part of the F&TA on Existing Emergency Procedures to the extent they will still be in use after implementation of the EOPs, P.3 Reference 12. Station Blackout and Remote Shutdown procedures are considered to be emergency procedures, and should be addressed by the DCRDR, Reference 11, P.3.

NPPD RESPONSE:

Per NRC letters of references 9 and 12 to the District and the subsequent conference call with the NRC staff (Ref. 21), NPPD will extend the F&TA to the station emergency procedures that are still in use after the EOPs have been implemented. The 29 fire protection procedures do not need to undergo F&TA (NRC staff Guidance, Ref. 21). The emergency procedures, that will be subjected to F&TA, are listed in Table 2.4 and consist of:

- Act of Nature, Series 5.1 (3 Procedures)
- Special Events That Include Station Blackout Procedures, Series 5.2 (11 Procedures)
- Postulated Accidents Procedures, Series 5.3 (6 Procedures)
- Emergency Plan Implementation Procedures - Dose Assessment, Series 5.7 (1 Procedures)
- Alternate (Remote) Shutdown Procedures, that are Presently Under Development.

The F&TA on these procedures will follow the same steps as the EOPs. HEDs resulting from this task will be assessed for safety significance, and corrections will be implemented in a manner similar to the other HED corrections (Refer to section 6 of this report).

TABLE 2.4

EXTENSION OF TASK ANALYSIS
TO STATION EMERGENCY PROCEDURES (EPs)
REFERENCED IN THE EMERGENCY OPERATING
PROCEDURES (EOPs) AND TO THOSE STILL IN USE
AFTER IMPLEMENTATION OF THE EOPs

List of EPs

Procedure Number		Title
A.	Acts of Nature	
	5.1.1	Earthquake
	5.1.2	Operation During Tornado Watch
	5.1.3	Flood
B.	Special Events	
	5.2.1	Shutdown From Outside Control Room
	5.2.3	Loss Of All Service Water
	5.2.4	Loss Of Reactor Equipment Cooling (REC) Water
	5.2.5	Loss Of AC Power - Use Of Standby AC Power
	5.2.5.1	Loss Of All Site AC Power
	5.2.6	Loss Of AC Instrument Bus
	5.2.7	Loss Of DC Instrument Bus
	5.2.8	Loss Of Instrument Air
	5.2.10	Service Water Injection To Reactor Vessel (Referenced In EOPs)
	5.2.13	Maximizing CRD System Flow To Reactor Vessel (Referenced In EOPs)
	5.2.14	Alternate Means To Inject Boron To RPV (Referenced In EOPs)
C.	Postulated Accidents	
	5.3.1	Closure Of MSIVs On High Radiation
	5.3.4	Pipe Break Inside Turbine Building
	5.3.5	Refueling Floor High Radiation

TABLE 2.4 (continued)

5.3.6	Area Radiation Monitor Alarms
5.3.7	Post-Accident Venting Of Primary Containment (Reference In EOPs)
5.3.10	Control Building Basement Flooding

D. Emergency Plan Implementation Procedures

5.7.17	Dose Assessment (Referenced In EOPs)

E. Alternate Shutdown Procedures

To be developed prior to Alternate Shutdown Panel installation.

REQUIREMENTS: 2.6 Performance of F&TA on Revised EOPs

NRC REQUEST: The licensee should complete that part of the F&TA on Revised EOPs, if significant revisions are required prior to implementation, Reference 12, P.3.

NPPD RESPONSE:

The F&TA given in the DCRDR summary report (Ref. 10), utilized CNS emergency operating procedures (EOPs) revision 0 dated 4/6/84. In August 1985, CNS implemented EOPs, revision 1, dated 8/1/85. As the present F&TA is extended to include instrument operability requirements (Section 2.1) and indicator resolution requirements (Section 2.2), entry conditions to emergencies, operator steps and cautions are revised to the newly implemented EOP's. Where the new revisions were judged to affect the Controls & Information needs/characteristics, new requirements are placed in the F&TA data sheets and comparison of requirements with control room inventory is conducted. The following changes between the newly implemented EOPs and the 4/6/84 EOPs are significant:

- Deletion of the hydrogen and oxygen control sections of the EOPs, pending NRC approval of revision 4 of the BWROG emergency procedure guidelines (EPGs).
- Deletion of the secondary containment (SC) safety limits for quad area levels as independent entry conditions to emergency, and incorporating them in SC quad sump levels.
- Utilization of the reactor water cleanup (RWCU) system as a backup to the standby liquid control (SLC) system.

Consideration of these revisions has resulted in modifications to related HEDs and corresponding design corrections. Appendix D gives the updated task analysis HEDs, their implementation actions and schedule of implementation.

REQUIREMENTS: 2.7 Performance of F&TA on SPDS and PMIS Procedures

NRC REQUEST: The licensee should complete that part of the F&TA on SPDS and PMIS procedures required to support performance of EOPs, Reference 11, P.12.

NPPD RESPONSE:

In discussing the DCRDR supplement tasks with the NRC staff (Ref. 21), the District noted that Cooper station does not have a specific procedure for SPDS/PMIS use during emergencies, and therefore a F&TA on these procedures could not be performed. After hearing an explanation of how the District views the SPDS as a supporting element to the EOPs, the staff agreed that task analysis of the SPDS/PMIS procedures will not be required under this DCRDR program.

3.0 COMPARISON OF DISPLAY AND CONTROL REQUIREMENTS WITH CONTROL ROOM INVENTORY

REQUIREMENTS: Comparison of Instrument Requirements with Control Room Inventory and Verification of Instrument Suitability

NRC ASSESSMENT/ REQUEST: The NPPD method for comparing operator control and information requirements with the control room inventory can be used to satisfy the requirements of NUREG-0737, Supplement 1.

As the Function and Task Analysis is revised to address the concerns raised in the previous section, this comparison of information and control requirements with the characteristics of installed instruments and controls should be repeated to ensure all requirements identified by the Function and Task Analysis have been addressed, Reference 11, P.5.

NPPD RESPONSE:

In performing the supplemental F&TA noted in this report, the DCRDR team continued to utilize NPPD process of comparing the instrument requirements with control room inventory reported in the summary report Ref. 10. During the task analysis walk-through in the control room, the operator read the task, then walked through the task aspects at the control panel. The information and controls availability and specific characteristics were determined from the control room panels. The following specific characteristics were identified: Equipment No., Panel No., Parameter, Range, Setpoint, and Controls' characteristics. This data was documented in the 5th and 6th columns of the task analysis data sheets under control room inventory heading (Refer to the task analysis A-Sheets of Appendix A)

Additional entry of CR inventory regarding instrument operability requirements (Section 2.1 of this report) and instrument accuracy requirement (Section 2.2) are included in the task analysis B-sheets of Appendix A, as follows:

1) For the instrument operability requirements, the comparison process of the instrument operability requirements with CNS R.G. 1.97 instrument category status (or RPS instrumentation status) is shown in Figure 2.2. The existing data on instrument category or planned category modifications, as reported by the District to the NRC in reference 15, are listed in column 3 of the task analysis B-sheets of Appendix A. The RPS related instrument for CNS as obtained from reference 16, are also entered in column 3 of the task analysis B-sheets.

Verification of the suitability of the instrument design and qualification status against the requirements is documented in column 4 of the B-sheets. When the suitability criteria was not met, the reason was noted and the human engineering discrepancy was documented in the 'Notes" column of the task analysis data sheets.

2) For the instrument accuracy requirements. The comparison process of the required accuracy against the indicator's resolution, as measured in terms of the minimum interval of the indicator scale, is shown in Figure 2.3. The minimum scale interval of each of the indicator's inventory is entered on column 7 of the task analysis B-sheets of Appendix A. Verification of the suitability of the indicator resolution against the accuracy requirements is documented on column 8 of the B-sheets. When the suitability criteria was not met, this was noted and the human engineering discrepancy was documented.

The results of the task analysis HEDs have been updated to include the changes in the F&TA performed. Appendix D gives a summary of the F&TA HEDs and their assessment.

4.0 CONTROL ROOM SURVEY

NRC ASSESSMENT: As discussed in Refs. 4 and 7, the use of the BWROG Control Room Survey checklist, together with the supplement, constitutes an acceptable method that can be used to fulfill the survey requirements of NUREG-0737, Supplement 1, Reference 11, P.6.

The licensee should review existing surveys for adequacy and perform resurveys as necessary, and provide detailed documentation of the results and actions taken, Reference 12, P.4.

REQUIREMENTS: 4.1 Review of Apparent Oversights In the Control Room Survey

NRC REQUEST: Apparent oversights exist in the Control Room Survey. These should be reviewed to determine if they are indicative of a systematic problem with the survey process, and appropriate action should be taken, Reference 11, P.12.

NPPD RESPONSE:

As described in CNS DCRDR program plan (Ref. 4) and reported in the DCRDR summary report (Ref. 10), NPPD has utilized the BWROG control room survey checklist together with the supplement in performing the control room survey.

The DCRDR team, in response to the NRC request for review of the existing survey for adequacy, has performed this review. The conclusion of the team is that CNS control room survey adequately meets NUREG-0737, supplement 1 survey requirements, though, certain recommendations, if fulfilled, will strengthen both the survey process and documentation of the results. These recommendations are:

- Adding more details on the survey checklists identifying the components experiencing the discrepancies.

- Describing the HED in more details on the HED sheet, identifying the HED-related component by function or identification number, and noting the component's associated system.

- Identifying a reference for the human factors guidelines or standards to which the HED can be measured against.

These recommendations were fulfilled. More details were added to the survey checklists, and new HED sheets were developed and completed for the old HEDs (176 HEDs) and for the new HEDs (351 HEDs), as described in section 5.2 and 6.1 of this report. Appendix B gives a sample of the HED sheets for one front panel (Panel 9-3) and one back panel (VBD-S), and as noted, detailed documentation of the HEDs was included.

In reference to the oversights noted in references 9 and 11, the DCRDR team has tracked these deficiencies with the intent of identifying them, if they have not been identified already. The results of tracking the oversights, noted in the TER/NRC report of reference 11, are:

1. Several switch directions of movement are reversed from expected conventions on Panels VBD-A and VBD-C:

   These discrepancies have previously been identified as human engineering observations (HEOs) in the summary report, subsequently, they have been reassessed for safety significance as described in section 5.2 of this report, and are now scheduled for correction (Refer to HED ID. 77SS, Record #344 for VBD-A and HED ID. 95SS, Record #361 for VBD-C in Appendix D)

2. Nonlinear, homemade scale on Reactor Feed Pump Suction Temperature Indicator, on Panel VBD-A:

   The nonlinearity of the scale and the temporary markings placed on the meter have been identified in HED 76SS, Record #343 , and HED 67SS, Record #335 of Appendix D. The meter scale is scheduled for replacement.

3. Round and T-shaped switch handles obscure view of position indices and labels on switch escutcheons on Panels VBD-A and VBD-C:

   The discrepancies are identified under HED 62SS, Record #331, and HED 90SS, Record #356 of Appendix D. Correction will be made through replacement of switch handles.

4. No demarcation of Switch Annunciator Acknowledge, Test, Reset and Ground Reset Switches on VBD-C:

   This discrepancy was identified in the summary report under HED 160S, Record #160. Correction is planned in accordance with CNS HF standards of coding the alarm response systems on all panels.

The schedule for correcting these discrepancies follows the schedule plan of the DCRDR correction of all the HEDs (620 HED) noted in Table 6.1 of section 6.1 of this report.

REQUIREMENTS: 4.2 Consistency of SPDS/PMIS Human Factor Principles with the Control Room

NRC REQUEST: The licensee should describe plans and schedules for providing human factors input to and coordination of the design and installation of the Plant Management Information System (PMIS) and SPDS within the control room, to ensure human factors principles, conventions, and plant nomenclature, that were applied to the control room (including NUREG-0700 principles related to computers) are applied to the PMIS and SPDS, Reference 12, P.4.

NPPD RESPONSE:

SPDS/PMIS was developed for NPPD by Science Applications, Inc. (SAI). SAI prepared human factors plans for both SPDS and PMIS (Reference 23-25) which were used as templates to cover all human factors efforts performed over the course of the SPDS/PMIS project.

The human factors plan for SPDS was developed to follow the requirements for SPDS as contained in NUREG 0737, Supplement 1. This human factors plan has as its emphasis, that the SPDS would display the appropriate information required by the operational personnel and that the information would be displayed in a manner that allows the man-machine interfaces to work in a smooth and efficient manner.

The human factors plan for PMIS was developed to address both: (1) The human factors principles to be used during the development of display formats provided with the PMIS and (2) the methodology to be used for performing a human factors review of all generic displays and controls of the PMIS.

SAI, as part of the human factor plans for SPDS and PMIS, developed human factors engineering guidelines (Reference 24). These human factors engineering guidelines were taken from NUREG-0700 and rearranged in a manner more suitable to the SPDS/PMIS project. These guidelines were used as guidance during the design phase of every man-machine interface component. The guidelines were used in conjunction with a compliance checklist form for the SPDS and a non-compliance explanation form used to evaluate the compliance and explain any non-compliance for the SPDS man-machine interface. To get operator feedback on the effectiveness of the SPDS CRT displays, a display characteristics questionnaire was used.

NPPD will obtain copies of SAI SPDS checklists, and will review their contents against the as-built displays. Consistency of the SPDS with the control room human factor principles will be checked through this review. Based on the results of the review, NPPD will take action to correct the discrepancies.

4.0 CONTROL ROOM SURVEY, CONT'D

REQUIREMENTS: 4.3 Validation of Control Room Environment And Communication Survey Following Planned Modifications

NRC ASSESSMENT/ REQUEST: The in-progress audit noted that a number of changes that may affect the control room environment and communications are anticipated. Also, new equipment that may be adversely affected by the environment is to be installed. After these modifications are completed, the environment and communications surveys should be repeated. We suggest that the NUREG-0700 checklists would form a basis for these surveys that is superior to the BWROG checklist. During resurvey, the operator's communications ability while using self-contained breathing apparatus and respirators should be evaluated, Reference 11, P.7.

NPPD RESPONSE:

CNS control room environment, and communications were surveyed under the DCRDR program, and the results of the survey are given in the DCRDR summary report (Ref. 10). Several discrepancies were identified in the survey. They were assessed by the DCRDR team, and implementation actions were identified to correct them. The discrepancies noted are:

- Communication system not redundant (HED 172S)
- The PA system has no channel dedicated to operations (HED 173S)
- Communication system not equipped with channel select (HED 174s)
- Lack of ventilation system supply filtration (HED 2I)
- Lack of backup cooling supply for the control room air conditioning system (HED 3I)

The schedule for implementing the design corrections, noted in the summary report, was 2nd refueling.

In addition, the emergency lighting in the control room was examined per NUREG-0700 criteria (section 6.1.5.4 of Reference 5), and it was concluded that the front and back panel lighting is inadequate (HED 343SS Record #617). The DCRDR team assessed this HED as significant, and the implementation of the corrections is scheduled for 3rd refueling (Refer to section 6.1 for implementation schedule of the design modification).

Following the completion of these modifications, NPPD will perform a survey update of CNS control environment to verify conformance with NUREG-0700 criteria. During this resurvey, the operator's communications ability while using self-contained breathing apparatus and respirators will be evaluated.

RECOMMENDATIONS 4.4 Upgrading of HED Record Sheets

NRC REQUEST: HED records should be upgraded so the written documentation alone is adequate to provide non-DCRDR team members a clear understanding of each HED, Reference 11, P.13.

NPPD RESPONSE:

NPPD is instituting a plan for documenting all the HEDs (including those noted as HEOs in the summary report) on the IBM-PC utilizing the DBASE-III software. This system can list, track and sort the HEDs. The new format of the HED sheets has been expanded to include the following information:

- HED ID. number.
- HED description
- HED source (F&TA, Control Room Survey, Operating Experience)
- Human Factor topic (Labeling, Color Coding, visual displays, annunciators, controls, communication,...etc.)
- NUREG-0700 related section, with excerpts on HF guidelines noted in the comments section.
- Related system or subsystem.
- Component ID where the discrepancy was found (description by Plant ID number or by function).
- Implementation action (fix, no action, delete, or place on SPPD/PMIS)
- Type of correction (Enhancement or Modification).
- Resolution of the HED/description of the corrective action.
- Implementation date (1st, 2nd, or 3rd refueling)
- Verification that the HED has been corrected without creating a new discrepancy.
- Implementation date, and validation of the implemented design.

Such information encompasses the full spectrum of the DCRDR program elements ranging from HED Identification, Reference to NUREG-0700, Assessment, Corrective Action/Resolution, Verification of corrective action, Implementation, and Validation of the implemented design. Appendix B gives two samples of the HED sheets for one front panel (Panel 9-3) and one back panel (VBD-S). As noted, the contents of the HED sheet provide the Non-DCRDR members with adequate information to address the HED and implement the design corrections.

5. ASSESSMENT OF HUMAN ENGINEERING DISCREPANCIES (HEDs) TO DETERMINE WHICH HEDS ARE SIGNIFICANT AND SHOULD BE CORRECTED

REQUIREMENTS: 5.1 Reevaluation of the Safety Significance of the Lack of Lamp Test Capability

NRC ASSESSMENT/ REQUEST: NPPD's process for assessing HEDs once they were categorized as such is in compliance with the requirements of NUREG-0737, Supplement 1. We believe, however, that the safety significance of the lack of lamp test capability was understated and recommend that the decision not to correct this HED be reevaluated, Reference 11, P.8.

NPPD RESPONSE:

Per the NRC request, NPPD has reevaluated the lack of lamp test capability in CNS control room, by performing several feasibility studies (Ref. 26) on the panels indicating lights. The purpose of these studies is to determine if practical methods are available to provide a high degree of confidence that control room panel indicating lights are available when called upon. The feasibility studies included:

1. Modifying the operating lights with Push-to-Test indicating lights with control test power.

2. Modifying the existing lights with Push-to-Test indicating lights with local test power.

3. Modifying the existing lights with Area Test Switch with control test power.

4. Modifying the existing lights with Area Test Switch with local test power.

5. Replacement of existing lights with Twin-Bulb indicating lights.

6. Periodic replacement of all indicator light bulbs.

7. Institution of administrative controls to check failed indicating lights.

Each of these methods was examined for advantages/disadvantages, practicality and cost, and compatibility with existing plant equipment and circuits. In addition, consideration was given to the type of the existing indicating lights in the control room; the single-bulb indicating lights and the two-bulbs indicating lights (on-off, open-close) where existing bulb failure detection features already exist. It is the conclusion of the DCRDR team that a combination of administrative controls and lamp test feature (or provision of dual-bulbs) for the existing single-bulb indicating lights, would provide the most cost-effective methods of light failure detection.

NPPD proposed corrective action of this task is:

1. To institute an administrative control (through control room logs) to check for failed indicating lights on a daily basis (2nd or 3rd shift).

2. To modify the most critical single-bulb indicating lights with Push-to-Test Indicating lights or with dual-bulb indicating lights.

As a follow-up of the task, CNS control room was surveyed for signal-bulb indications. The results of this survey is given in Table 5.1, which shows a total of 127 single-bulb indication exist in the control room. Those indicators with no-safety significance will be eliminated from this list, and the remaining indicators will undergo design modifications.

TABLE 5.1

LIST OF SINGLE-BULB INDICATIONS IN CNS CONTROL ROOM

Panel	No. of single bulb Indications	Description
		RHR A:
9-3		
	2	3A & 3C Signal Lights
	1	Logic Initiation
	1	Containment Spray Control
	1	Shutdown Control Valve 29A
	1	Containment Spray Signal
		RHR B:
	2	3C & 3D Signal Lights
	1	Logic Initiation
	1	Containment Spray Control
	1	Shutdown Control Valve 29B
	1	Containment Spray Signal
		ADS & LLS:
	8	Accumulator Pressure
		CS A:
	1	Injection Valve Seal-In
	1	Pump Stop Signal Seal-In
		CS B:
	1	Injection Valve Seal-In
	1	Pump Stop Signal Seal-In
		HPCI:
	1	Turbine Test Power
	1	Initiation Signal Reset
	1	Auto Isol. Signal Reset
	1	Reactor HI WL Reset

TABLE 5.1 (CONT'D)

LIST OF SINGLE BULB INDICATIONS IN CNS CONTROL ROOM

Panel	No. of single bulb Indications	Description
9-4		RCIC:
	1	Turbine Test Power
	1	Auto Isol.
	1	Initiation Signal
		OTHERS:
	1	Radwaste Trouble Alarm Bypass
	2	RRMG - A&B Runback Reset
	2	Scoop Tube Reset A&B
	2	DC Supervisor Lockout Power A&B
9-5	1	Refuel Mod. Select Permissive
	1	Emergency Notch Override
	1	Safety System Panel IL
	3	HI WL TRIP Logic A,B,C
	2	PCIS Channel A,B
	2	PCIS Channel A,B
VBD-A		
	2	Turbine Trip Power Ind. A,B
	2	RFP - H.P. Stop Test A,B Pumps
	2	L.P. Stop Test A,B Pumps
	2	Overspeed Trip Block A,B Pumps
	1	Annunc. Bypass - Water Treatment
	1	- Cond. Filter Demin.
	2	Service Water Pumps 1A, 1C.
VBD-B		
	2	Service Water Pumps 1B, 1D
	1	Main Turbine Trip Supervisory
	1	Main Turbine Autostop Trip Latch
	1	Emergency BRG Oil Pump
	1	Gland Seal Aux. ST. Supply
	1	Mn Turbin. Trip Circuit Energizer IL
	1	Turb Trip Reset Relay
	1	E/H Low Fluid Level Lockout relay
	1	Annunc. Bypass Auto Offgas
	1	Annunc. Bypass Auto Radwaste

TABLE 5.1 (CONT'D)

LIST OF SINGLE BULB INDICATIONS IN CNS CONTROL ROOM

Panel	No. of single bulb Indications	Description
VBD-C		
	1	Synch SW 1FS
	1	" " 1GS
	1	" " 1AN-1AS
	1	" " 1BN-1BS
	2	D/G #1,2 Incomplete Seq.
	1	ACB 3310 Reclosure Cutout On
	1	Synchro Check Permissive to closure 3310/3312
	2	161 KV Switch Yd OCB's 160A & 160G trip & L.O. Circuit No. 1
	2	Bypass Transf/Inverter Selector
VBD-F		
	9	86 - Lockout Relays
	4	DC Feed Power To MN Transf
VBD-H		
	2	DW Temp Recorders & Ind. Normal/ Alternate Power Supply.
VBD-J		
	1	DW Airlock Door Control
	1	RR Airlock Outer Door
	1	RR Airlock Inter door
VBD-P_1 & P_2		
	2	Annunc. Power Supply 125 VDC
9-16		
	2	RPS - M-G set power Ind. Alter Source/ Gen A.
	2	Alter Source/Gen B.

TABLE 5.1 (CONT'D)

LIST OF SINGLE BULB INDICATIONS IN CNS CONTROL ROOM

Panel	No. of single bulb Indications	Description
9-15 & 9-17:		
	2	RFP A,B Turb Control Reset
	2	CRD Stabilizing Valves
9-02		
	1	SW Source Check
	1	REC Source check
	2	Offgas vent pipe source check A&B
	1	Offgas vent pipe line purge
	1	Offgas chamber purge
Total:	127	

5. ASSESSMENT OF HUMAN ENGINEERING DISCREPANCIES (HEDs) TO DETERMINE WHICH HEDS ARE SIGNIFICANT AND SHOULD BE CORRECTED, CONT'D

REQUIREMENTS: 5.2 Reassessment of Human Engineering Observations (HEOs)

NRC ASSESSMENT/ REQUEST: The methodology for segregating HEDs and HEOs during the control room survey does not fulfill the HED assessment requirement of Supplement 1 to NUREG-0737.

NPPD may resolve this issue by documenting the specifics of each HEO in their supplement to the DCRDR Summary Report and providing, for review, justification for each item not corrected. This action will bring NPPD's program into conformity with the BWROG position that HEDs identified by the control room survey will be evaluated on an item-to-item basis, Reference 11, P.8.

NPPD RESPONSE:

In the previous assessment of the HEOs, collected through the control room survey, the DCRDR team has utilized two-step approach in their assessment approach:

1) Screening the HEOs to these with high or intermediate error potential and with higher or intermediate non-compliance with human factor standards. The criteria used for screening is that of the BWROG (Ref. 27).

2) The screened HEOs (later noted as HEDs) were assessed individually for safety significance, and corrections were later selected by the DCRDR team.

The DCRDR screening process resulted in a moderate number of survey HEDs (176 HEDs). This was considered acceptable in view that correction of all the human factors deficiencies in the control room may not be cost effective.

The NRC in their response to CNS DCRDR summary report (Ref. 12) has objected to the above-mentioned screening process, and required that each of the control room discrepancies be assessed for safety significance item-by-item. in the District letter to the commission, (Ref. 13) NPPD has agreed to comply with this request.

The currently-used methodology of assessing the control room discrepancies is shown in Fig. 5.1, where it differs from the one presented in the summary report in that the screening process has been eliminated. All the control room survey discrepancies have undergone the same assessment process, noted in Fig. 5.2, as the original HEDs. The result of the new assessment is an additional 351 supplemental HEDs, that were added to the original HEDs. This makes a total of 620 HEDs. Appendix C gives a summary description of the supplemental HEDs, their assessment and corrective actions.

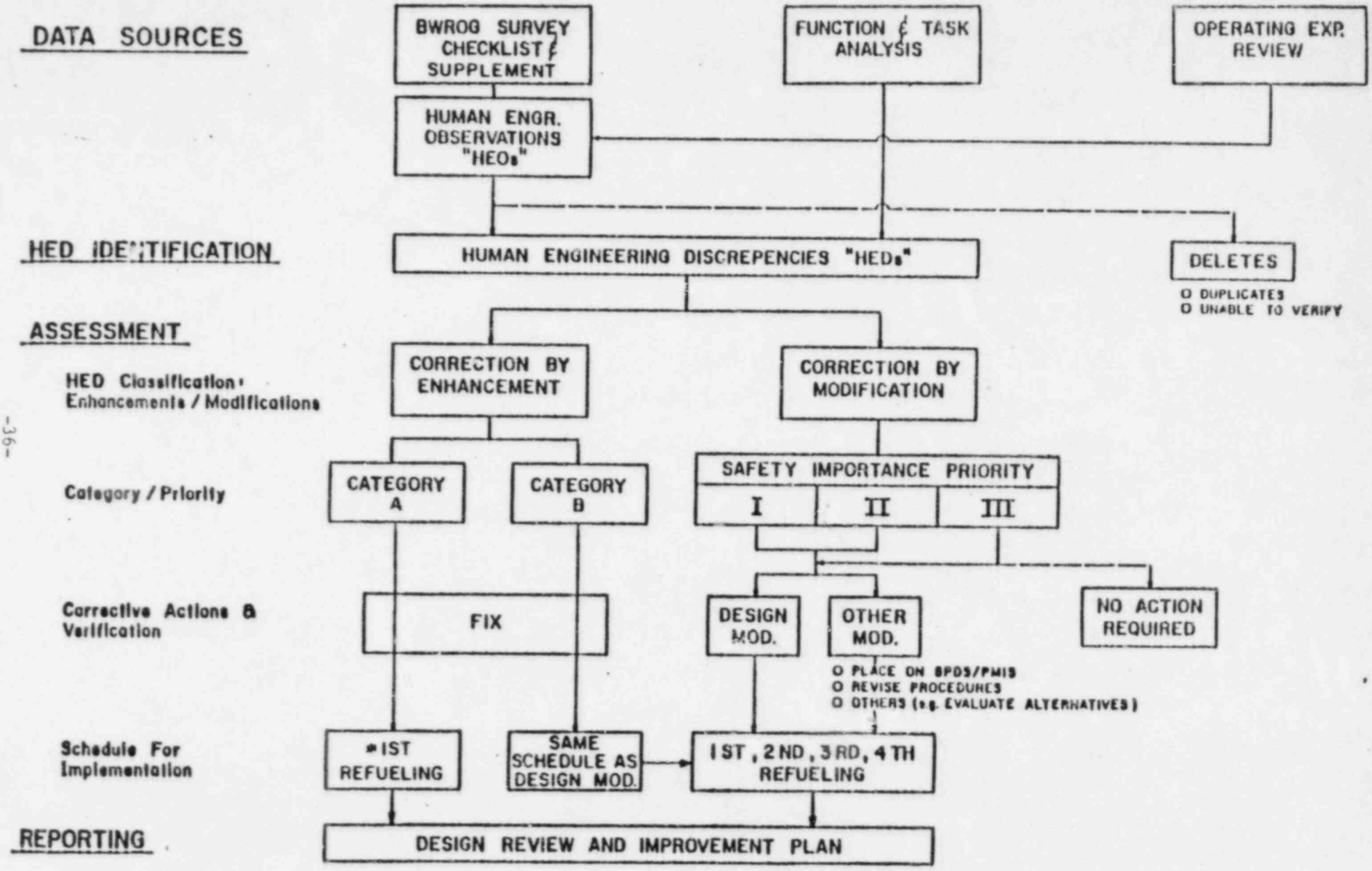


FIG. 5.1 - CNS DETAILED CONTROL ROOM DESIGN REVIEW PROCESS

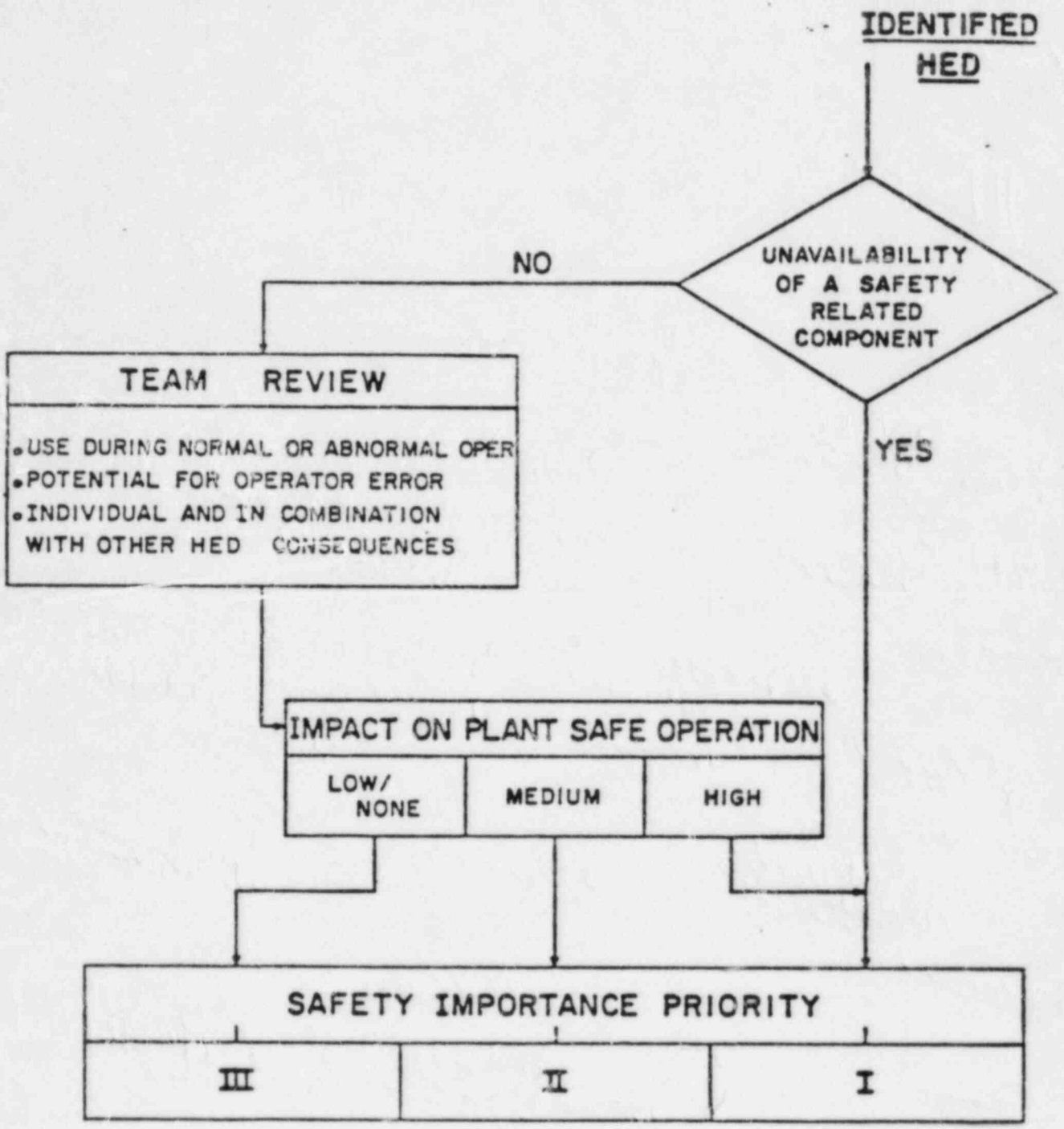


FIG. 5.2 -PRIORITIZATION OF HEDs ACCORDING TO SAFETY IMPORTANCE

6. SELECTION OF DESIGN IMPROVEMENTS

NRC ASSESSMENT: In general, the process used for selecting HED's to be corrected and for scheduling implementation dates meets the requirements of NUREG-0737, Supplement 1, Reference 12, P.4.

NPPD should ensure their Summary Report Supplement discusses the following items in sufficient details to allow NRC review and determination whether the DCRDR requirements of Supplement 1 to NUREG-0737 have been met.

REQUIREMENTS: 6.1 Planned Modifications To Resolve HEDs & Schedule

NRC REQUEST: In its Supplemental Summary Report the licensee should describe all modifications planned to resolve HED's and provide a schedule for correction HED's, Reference 12, P.4.

In addition, the licensee should provide documentation of the procedure used to evaluate each HED through the selection of design improvement, and the verification and implementation processes, in sufficient detail to permit NRC evaluation of the process used, Reference 12, P.4.

NPPD RESPONSE:

As described in section 5.2 of this report, the assessment of the supplemental HEDs and the process used for selecting their corrective actions have followed the same procedures reported in the summary report (Ref. 10). These supplemental HEDs and the original HED were combined to give a full list of 620 HEDs, which have been addressed for correction by CNS. Appendix D gives the results and assessment summary of all the HEDs.

In scheduling implementation dates for these corrections, the Engineering/Implementation team of the DCRDR program (refer to section 1 of this report) has setup a master schedule plan for control room corrections as:

1st Refueling:
- VBD-S
- VBD-J
- VBD-R
- Panel 9-3
- Panel 9-4
- Panel 9-5

2nd Refueling:
- VBD-M
- VBD-K
- VBD-H
- Panel 9-02
- Panel 9-21
- Panel 9-10
- Panel 9-11
- Railing
- Annunciators
- Fire panel
- Environment & Communication

3rd Refueling:
- VBD-Q&G
- VBD-P_1&P_2
- Emergency Lighting
- VBD-A
- VBD-B
- VBD-C

This schedule varies from that reported in the summary report in the fact that panel enhancements are integrated with the design modifications, and R.G. 1.97 modification are coordinated with the DCRDR modifications. Per the district letter to the Commission (Reference 28), this new schedule would result in safety related modifications being implemented on a time scale which is faster then previously submitted (as evidenced by the planned corrections of reactor related enhancements and modifications of Panels 9-3, 9-4 and 9-5 by the 1st Refueling). Table 6.1 gives the detailed schedule plan of DCRDR corrections.

As for the procedure used for design corrections, NPPD has setup an organization of two teams (Refer to Section 1 of this report) with the responsibilities of developing: Resolutions of the HED's, Integrated enhancements and modifications for each of the panels, Detailed design of the corrections, verification of the design improvements, and Implementation of the improvements. Figure 6.1 shows the design improvements process that governs the DCRDR program. The input to the process are the HED sheets per panel (noted in Appendix B), the As-Is panel drawings, and the technical specifications of equipment on this panel. The output of the process is the design change package that includes detailed drawings of the upgraded panel, implementation plans of the modifications, and purchase requisitions for the new instruments. The process is guided by the results of two programs:

1. The feasibility study performed on these panels requiring major design modifications, as described in section 6.2 of this report.

2. CNS human factor (HF) standards and implementation guidelines, which form a standard guide for Cooper control room enhancements based on NUREG-0700 and other recent HF references on power plant control rooms, Ref. 29-31 (This standard developed by General Electric Company and their HF Consultant, is given in Appendix E of this report).

The design improvement process is accomplished by the DCRDR team reviewing the list of HEDs and corrections per panel, developing the necessary enhancements in terms of demarcation lines, mimics, meter banding, labeling, color coding..etc., rearranging the placement of controls and indicators to meet the HF standards, locating the new instruments of R.G. 1.97 and of the DCRDR, and lastly issuing 1) the final HED sheets, 2) conceptual panel drawings (in the form of computerized graphics, half-scale mockups or design drawings) indicating the enhancements and modifications, and 3) an integrated list of the required meter and chart recorder enhancements associated with this panel.

The design improvement process is illustrated in figures 6.2 to 6.8 for the back panels VBD-S, VBD-J and VBD-H, and figures 6.9 and 6.10 for the front panel 9-3. Comparison of figures 6.3 and 6.4 to the As-Is panel drawing of figure 6.2 shows how the enhancements and modifications of tables 6.2 and 6.3 are incorporated in this panel. Similar procedures are being followed with other panels, as noted in Figures 6.5 and 6.6 for VBD-J, and in figures 6.7 and 6.8 for VBD-R. For panel 9-3 where most of the standby core coolant systems (CSCS) instrumentation for the RHR, HPCI, CS and SRVs are located, many controls had to be relocated and new instruments had to be positioned to meet the enhancements and design modifications of tables 6.4 and 6.5 for this panel. Table 6.6 lists the meter and chart recorder enhancements for panel 9-3.

The detailed design of the panels follows the receipt of HED sheets, the enhancements and modifications lists and drawings. Detailed drawings of the panels, analysis in support of the panel design, implementation plans and purchase requisition requests are all prepared in an integrated design change (DC) package for each of the panels. Appendix G gives the DC package for VBD-S, that is under development by NPPD engineering. It should be noted, that any additional HEDs and corrections resulting from the performance of F&TA on plant procedures noted in section 2 of this report, will be incorporated in the DC package before final implementation of the design changes.

TABLE 6.1

SCHEDULE PLAN OF DCRDR CORRECTIONS

CRDR MODIFICATION SCHEDULE	PAGE 1 01/02/86	RES ENG	PER COM	REM MMHS
	KEY PROJECT MILESTONES			
1.	V BD S			
A.	ENGINEERING			240
B.	INSTALLATION			50
C.	CLOSE OUT DC			60
2.	V BD J			
A.	ENGINEERING			185
B.	INSTALLATION			20
C.	CLOSE OUT DC			40
3.	9-3 LRC			
A.	ENGINEERING			925
B.	INSTALLATION			85
C.	CLOSE OUT DC			200
4.	9-4 LRC			
A.	ENGINEERING			675
B.	INSTALLATION			60
C.	CLOSE OUT DC			150
5.	9-5 LRC			
A.	ENGINEERING			350
B.	INSTALLATION			40
C.	CLOSE OUT DC			100
6.	VBD-H			
A.	ENGINEERING			450
B.	INSTALLATION			35
C.	CLOSE OUT DC			75
7.	VBD-M			
A.	ENGINEERING			295
B.	INSTALLATION			25
C.	CLOSE OUT DC			50
8.	VBD-K			
A.	ENGINEERING			236
B.	INSTALLATION			20
C.	CLOSE OUT DC			40
9.	VBD-R			
A.	ENGINEERING			235
B.	INSTALLATION			20
C.	CLOSE OUT DC			40
10.	9-2			
A.	ENGINEERING			
B.	INSTALLATION			
C.	CLOSE OUT DC			

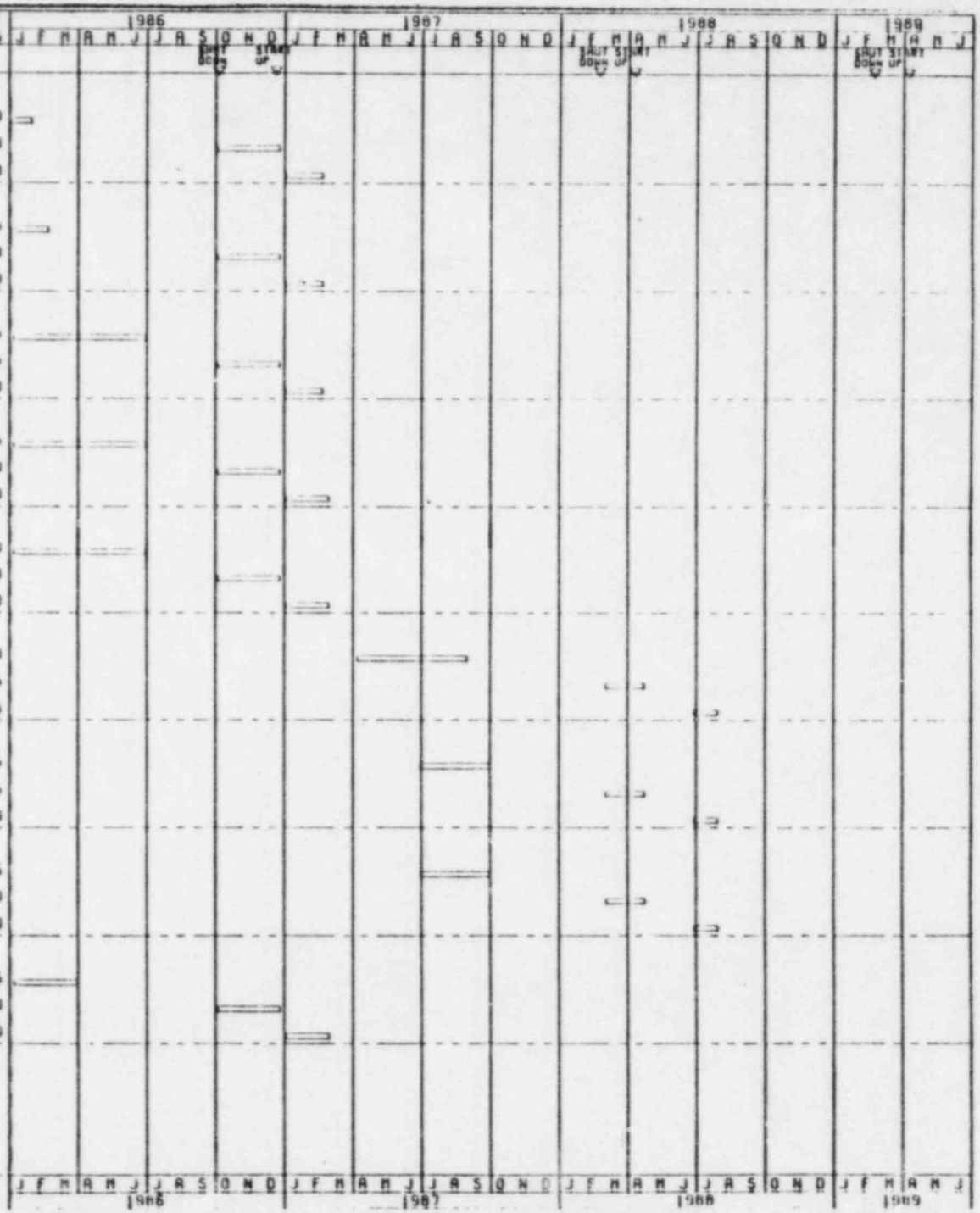


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TABLE 6.1 (continued)

SCHEDULE PLAN OF DCRDR CORRECTIONS

CRDR MODIFICATION SCHEDULE	PAGE 2 01/02/86	RES ENG	PER COM	REM MHRS
	KEY PROJECT MILESTONES			
11.	9-21			
A.	ENGINEERING			240
B.	INSTALLATION			50
C.	CLOSE OUT DC			60
12.	9-10			
A.	ENGINEERING			450
B.	INSTALLATION			40
C.	CLOSE OUT DC			100
13.	9-11			
A.	ENGINEERING			185
B.	INSTALLATION			20
C.	CLOSE OUT DC			40
14.	VBD Q			
A.	ENGINEERING			185
B.	INSTALLATION			20
C.	CLOSE OUT DC			40
15.	VBD Q			
A.	ENGINEERING			160
B.	INSTALLATION			20
C.	CLOSE OUT DC			30
16.	RAILING			
A.	ENGINEERING			50
B.	INSTALLATION			6
C.	CLOSE OUT DC			10
17.	ANNUNCIATOR			
A.	ENGINEERING			260
B.	INSTALLATION			40
C.	CLOSE OUT DC			40
18.	FIRE PANEL			
A.	ENGINEERING			370
B.	INSTALLATION			70
C.	CLOSE OUT DC			30
19.	EMERGENCY LIGHTS			
A.	ENGINEERING			180
B.	INSTALLATION			30
C.	CLOSE OUT DC			20
20.	ABC			
A.	ENGINEERING			95
B.	INSTALLATION			20
C.	CLOSE OUT DC			20

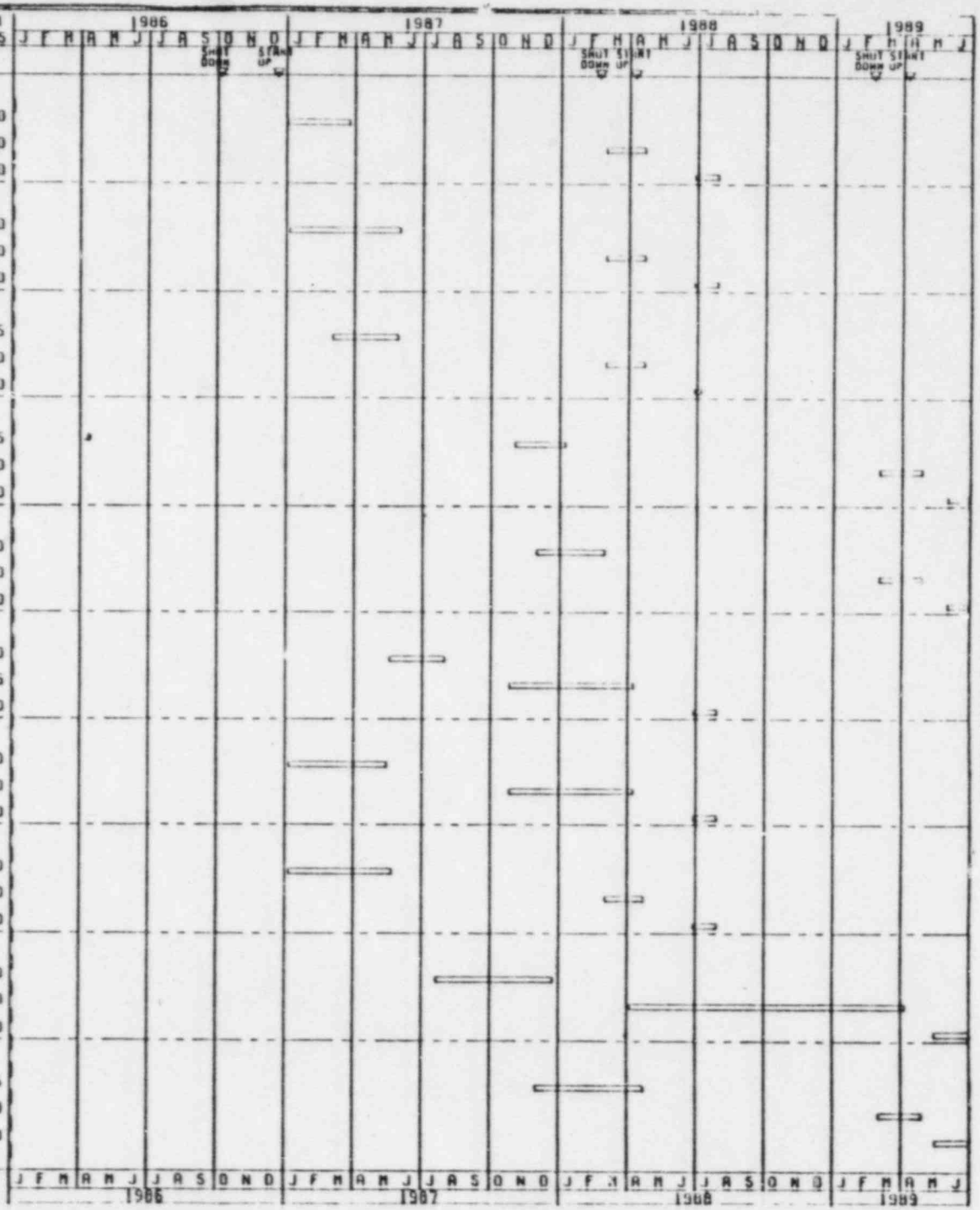

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TABLE 6.1 (continued)

SCHEDULE PLAN OF DCRDR CORRECTIONS

CRDR MODIFICATION SCHEDULE		PAGE 3 01/02/86	RES ENG	PER COM	REM MHRS	1986 J F M A M J J A S O N D	1987 J F M A M J J A S O N D	1988 J F M A M J J A S O N D	1989 J F M A M J
	KEY PROJECT MILESTONES					SHUT DOWN	START UP	SHUT DOWN	START UP
21.	CONTROL ROOM COMM.								
A.	ENGINEERING				100				
B.	INSTALLATION				30				
C.	CLOSE OUT DC				20				
22.	MISC. CRDR ENVIORMENT UPGRD								
A.	ENGINEERING				140				
B.	INSTALLATION				35				
C.	CLOSE OUT DC				50				
NOTE:	REM/MHRS ESTIMATES ARE FOR ENGINEERING ONLY								

REVISION : 01/2386

TABLE 6.2

VBD-S ENHANCEMENTS

- PANEL IDENTIFICATION
- SYSTEM AND SUBSYSTEM LABELING
- ELIMINATION OF TEMPORARY LABELS
- VALVE & PUMP SWITCHES DISTINCTION
- BANDING OF METERS
- COLOR CODING OF ANNUNCIATORS
- DEMARCATION OF SUBGROUPS
- PRIORITIZATION OF ALARMS

TABLE 6.3

VBD-S MODIFICATIONS

- INCORPORATION OF REACTOR BUILDING SUMP LEVEL INDICATIONS

- FUNCTIONAL GROUPING OF CONTROL BUILDING SUMP SWITCHES AND YARD SUMP SWITCHES

- RELOCATION OF ELEVATED RELEASED POINT (E.R.P.) SUMP SWITCHES AND DISPLAYS TO IMPROVE VISIBILITY AND MEET ANTHROPOMETRIC LIMITS

- STANDARDIZATION OF ALARM RESPONSE SYSTEM

TABLE 6.4

PANEL 9-3 ENHANCEMENTS

- FLOW PATH LINES FOR RHR, CS AND HPCI, WITH DISTINCTIVE COLOR CODING IDENTIFYING VARIOUS MODES OF SYSTEM OPERATION

- LINES OF DEMARCATION SEPARATING VARIOUS SUBGROUPINGS OF PC, NBI AND HPCI TURBINE AND HPCI PUMP DISPLAYS

- MATRIX IDENTIFICATION OF ANNUNCIATORS

- CLARIFICATION OF INCOMPLETE OR AMBIGUOUS LABLES

- MERGING OF NEW LABELS WITH EXISTING LABELS IN HIERARCHICAL FORM

- SCALE MARKING OF DISPLAYS, AND IDENTIFICATION OF PROCESS UNITS

- PRIORITIZATION OF ALARMS THROUGH COLOR CODING OF ALARM TILES

TABLE 6.5

PANEL 9-3 MODIFICATIONS

- RELOCATION OF RHR, CS, AND HPCI SWITCHES FOR:
  - IDENTIFICATION OF SYSTEMS' MODES OF OPERATION
  - DEVELOPMENT OF ORDERLY FLOW PATHS
  - CLOSER ASSOCIATION OF FEEDBACK TO RELATED CONTROLS
  - FUNCTIONAL SUBGROUPING OF RELATED CONTROLS
- INCORPORATION OF R.G. 1.97 INSTRUMENTATION AND REACTOR WATER LEVEL DISPLAYS
- STANDARDIZATION OF ALARM RESPONSE SYSTEM
- FUNCTIONAL SEPARATION OF PRIMARY CONTAINMENT (PC) DISPLAYS FROM REACTOR CONTROL DISPLAYS

TABLE 6.6

PANEL 9-3 METER INDICATION AND RECORDER ENHANCEMENTS

Item No.	ID	Description	New Label[1]	Banding: Normal (Green Band)	Banding: Entry To Emergency (Red Arrow)	Scale[2]: Present	Scale[2]: Change to	Process Units: Not Easily Read or identifiable	Process Units: Requires change to	Comments
1	POI-148A	Ht. Ext. Vent Vlv. 166A	POI-148A HT.EX.VENT VLV. 166A							
2	POI-149A	Ht.Ext. Vent Vlv. 167A	POI-149A HT.EX.VENT VLV. 167A							
3	PC-PR-1A	PC Pressure	PC-PR-1A PC PRESSURE	0-1.45	2 psig			x		o Place unit label on recorder cover below scale
4	PC-LR-1A	PC Level	PC-LR-1A PC LEVEL					x		o Recorders PC-LR-1A and NBI-PR-2A are swapped.
5	NBI-PR-2A	Reactor Pressure	NBI-PR-2A RX PRESSURE	825-1025	1045 psig	- 0,300,600,... 900, progression - Markings not sufficiently differentiated	- 0,200,400, 600,... - Distinguish between major and minor markings			o Place unit label on recorder cover below scale.

(1) Include power supply identification on label.

(2) Maintain a maximum of nine intermediate graduations between numbered markings

TABLE 6.6 (cont'd)

PANEL 9-3 METER INDICATION AND RECORDER ENHANCEMENTS

Item No.	ID	Description	New Label[1]	Banding: Normal (Green Band)	Banding: Entry To Emergency (Red Arrow)	Scale[2]: Present	Scale[2]: Change to	Process Units Not Easily Read or identifiable	Requires change to	Comments
6	PC-LI-13	Level	PC-LI-13 LEVEL	1.5" to -1"	1.5" and 2.5"	- 0,5,10,... progression with 19 markings between numerals - Black normal band markings	- Same progression with maximum of 9 markings between numerals - Green band per standards			
7	NBI-DPI-93	Jet Pump Dev. Head	NBI-DPI-93 JET PUMP DEV. HEAD							
8	PI-109	Pump Disch.	PI-109 PUMP DISCH.			- 0,3,6,... progression	- 0,2,4,6,... with distinctive markings			o Meters PI-109 & PI-112 are swapped.
9	PI-112	Turb. Steam	PI-112 TURB. STEAM							o Place a WARNING lower limit red mark at 150 psig on the meter scale.
10	PI-48A	Press	PI-48 PUMP PRESS.							

(1) Include power supply identification on label.

(2) Maintain a maximum of nine intermediate graduations between numbered markings

TABLE 6.6 (Cont'd)

PANEL 9-3 METER INDICATION AND RECORDER ENHANCEMENTS

Item No.	ID	Description	New Label[1]	Banding: Normal (Green Band)	Banding: Entry To Emergency (Red Arrow)	Scale[2]: Present	Scale[2]: Change to	Process Units: Not Easily Read or identifiable	Process Units: Requires change to	Comments
11	PI-50A	Flow	PI-50A PUMP FLOW							
12	PC-PR-512A	Drywell Pressure						x	psig	o Place unit label on recorder cover below scale
13	Not identified	RHR Flow A&B	FR-143 RHR FLOW			- Pointer covers scale markings - 0,4,8... progression with 19 markings between numerals	- 0,2,4,6.... progression	x	gpm	o Raise scale
14	PC-PI-512B	Drywell Pressure	PC-PI-512B DRYWELL PRESSURE	0-1.5" psig	2.0" psig	x			psig	o Requires meter recalibration for scale to read in psig other than psia
15	LI-12	Torus Level	LI-12 TORUS LEVEL	1.5" to -1"	1.5" & -2.5"					

(1) Include power supply identification on label.

(2) Maintain a maximum of nine intermediate graduations between numbered markings

TABLE 6.6 (Cont'd)

PANEL 9-3 METER INDICATION AND RECORDER ENHANCEMENTS

Item No.	ID	Description	New Label[1]	Banding: Normal (Green Band)	Banding: Entry To Emergency (Red Arrow)	Scale[2]: Present	Scale[2]: Change to	Process Units: Not Easily Read or identifiable	Process Units: Requires change to	Comments
16	LI-10	Torus Level	LI-10 TORUS LEVEL		- Red arrows at emergency levels (same as LI-12)	- 0,2,4,6,... progression with 11 markings bet. numerals - No +/- signs	- Nine markings bet numerals - Add +/- signs on meter scale.			
17	POI-148B	Ht.Ex. Vent Vlv. 166B	POI-148B HT.EX. VENT VLV. 166B							
18	POI-149B	Ht.Ex. Vent Vlv. 167B	POI-149B HT.EX. VENT VLV. 167B							
19	PI-48B	Press	PI-48B PUMP PRESS.							

(1) Include power supply identification on label.

(2) Maintain a maximum of nine intermediate graduations between numbered markings

TABLE 6.6 (Cont'd)

PANEL 9-3 METER INDICATION AND RECORDER ENHANCEMENTS

Item No.	ID	Description	New Label[1]	Banding: Normal (Green Band)	Banding: Entry To Emergency (Red Arrow)	Scale[2]: Present	Scale[2]: Change to	Process Units: Not Easily Read or Identifiable	Process Units: Requires change to	Comments
20	PI-50B	Flow	PI-50B PUMP FLOW							
21	PI-116	Pump Suction				- 0,15,30,.... progression	- 0,10,20 progression		psig	o Place a WARNING lower limit red mark at -15 VAC on meter scale
22	SI-2792	Turb Speed				- 0,1,2,3,4... from top to bottom.				o Change movement of pointer: bottom to top to indicate increase in speed
23	PI-111	Turb Steam				- Same as PI-109, Item 8	- Same as PI-109, Item 8			
24	RHR-FI-133A	Loop A Flow				- 0,5,10,... progression with 24 markings between numerals	- 0,2,4,6,... progression with distinctive marking lengths			
25	RHR-FI-133B	Loop B Flow				- Same as FI-133A Item 24	- Same as FI-133A Item 24			
26	PC-LR-11	Torus Level			- Red arrows at emergency levels (same as LI-12)					o Place unit label on recorder cover below scale)

(1) Include power supply identification on label.

(2) Maintain a maximum of nine intermediate graduations between numbered markings

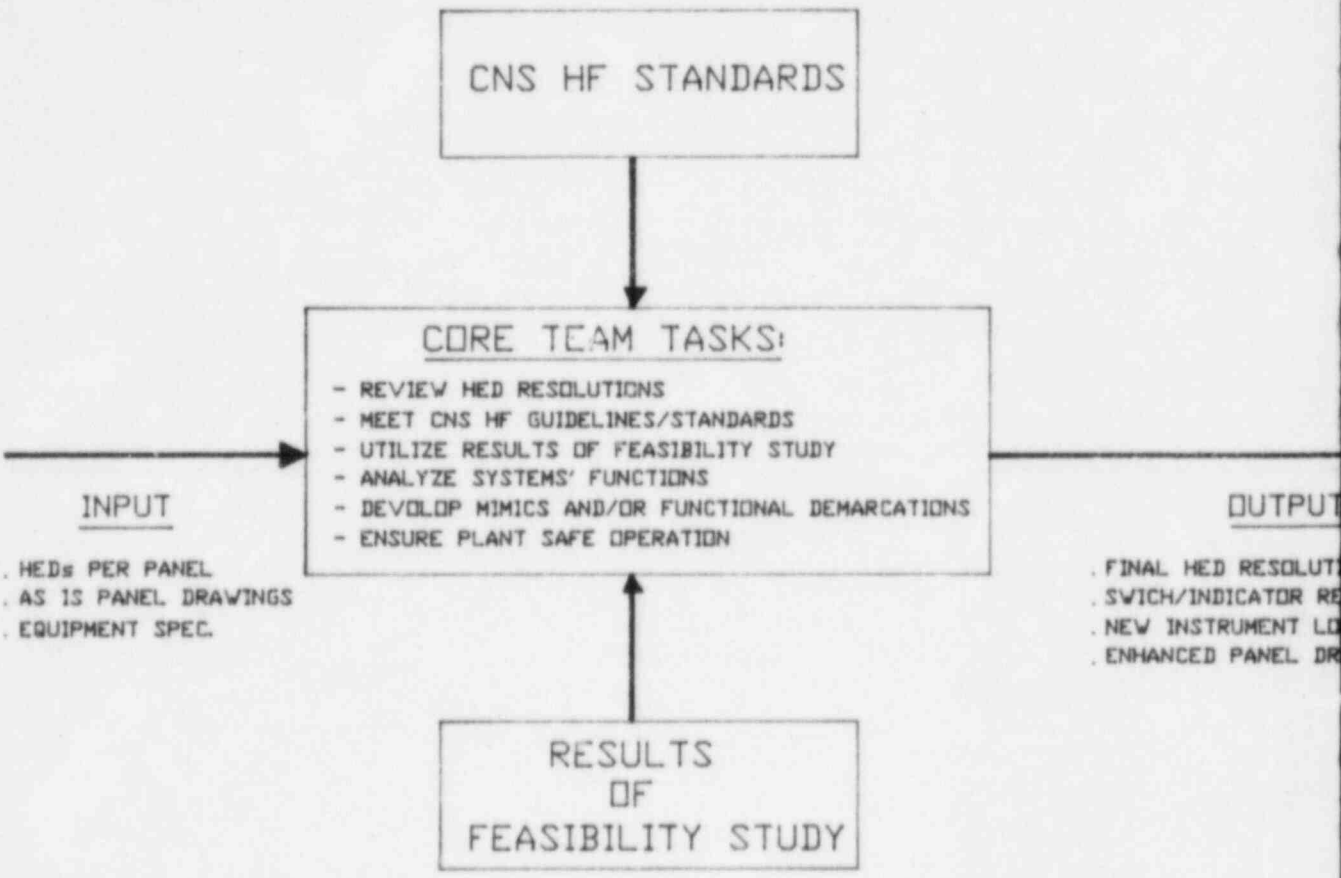


FIG 6.1 DCRDR DESIGN IMPROVE

ONS
-ARRANGEMENT
CATIONS
AWINGS

ENGINEERING TEAM TASKS:

- REVIEW CORE TEAM OUTPUT
- DEVELOP DETAILED IMPLEMENTATION PLANS
- PERFORM ANALYSIS IN SUPPORT OF DESIGN
- ISSUE DETAILED DRAWINGS
- DOCUMENT DESIGN CHANGES (DC)
- INITIATE PURCHASE REQUISITIONS

OUTPUT

. IMPLEMETATION PLAN
. DETAILED DRAWINGS
. DESIGN CHANGE PACKAGE

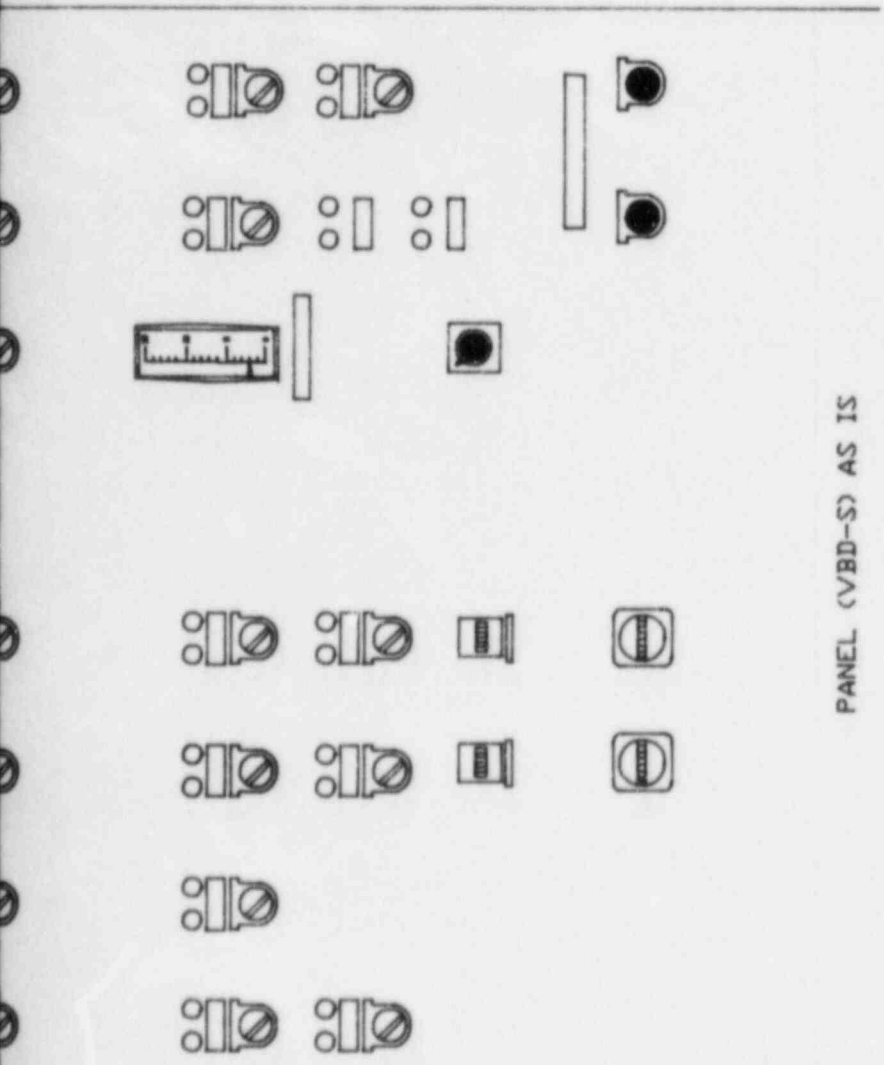
VERIFICATION/VALIDATION TASKS

CORE TEAM TO ENSURE:

- PROPOSED CHANGED DO NOT CREATE NEW HEDs OF HIGHER CONSEQUENCES THAN ORIGINAL HEDs
- PROPOSED CHANGE FOLLOW ONE OF ENGINEERING STANDARDS
- NEW DESIGN IMPROVES OPERATOR/MACHINE INTERFACE WHEN COMPARED TO OLD DESIGN

IMPLEMENT CHANGES

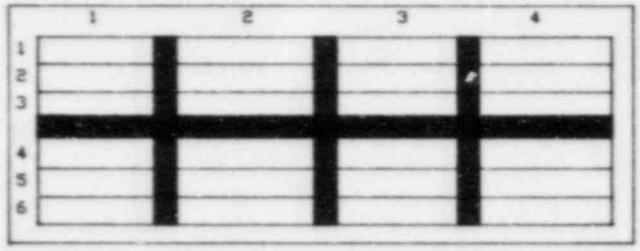
MENT PROCESS



PANEL (VBD-S) AS IS

FIG 6.2

SUMP PUMPS PANEL (VBD-S)



TURBINE GENERATOR BLDG SUMPS

RAD AREA EQUIP DR

SUMP P

RADIOACTIVE AREA FLOOR DRAINS

SUMP Q

SUMP R

SUMP S

NON RADIOACTIVE AREA FLOOR DRAINS

SUMP T

SUMP M

SUMP U

SUMP V

REACTOR BLDG SUMPS

AREA NW

SUMP A

AREA NE

SUMP B

AREA SW

SUMP C

AREA SE

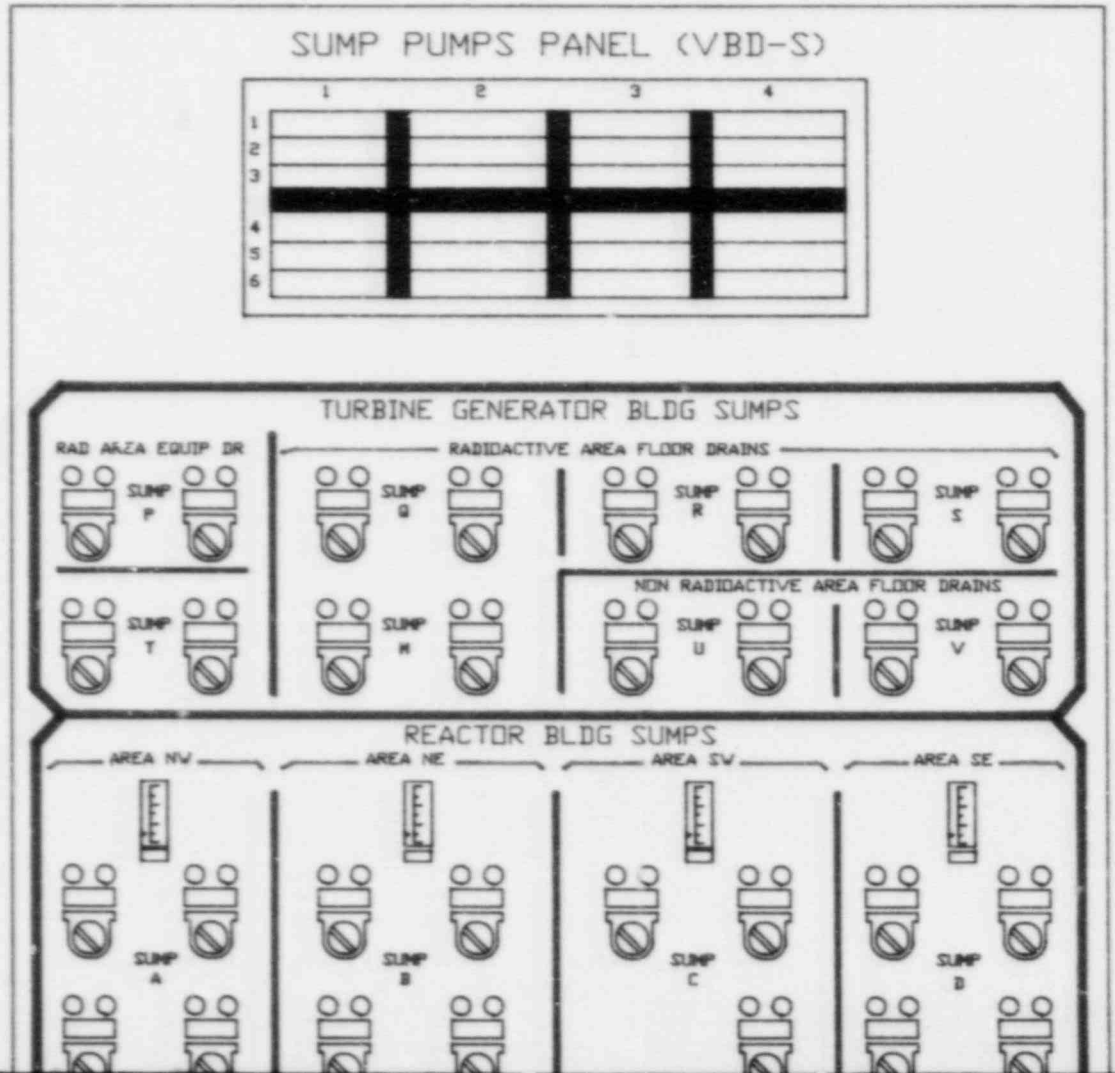
SUMP D

PANEL WITH ENHANCEMENTS

FIG 6.3

TI
APERTURE
CARD

Also Available O
Aperture Ca

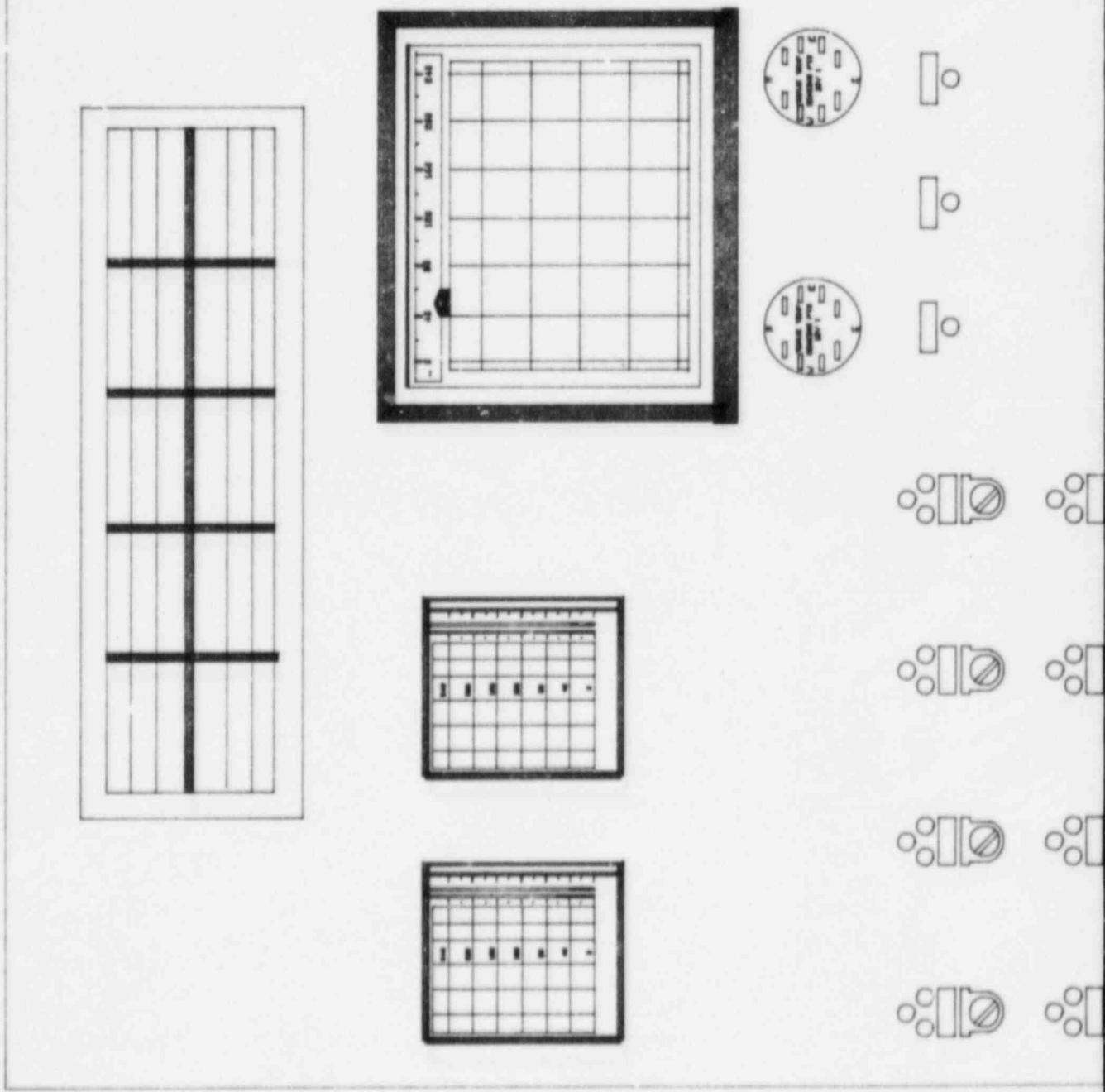

SUMP PUMPS PANEL (VBD-S)
1
2
3
4
1
2
3
4
5
6
TURBINE GENERATOR BLDG SUMPS
RAD AREA EQUIP DR
RADIOACTIVE AREA FLOOR DRAINS
NON RADIOACTIVE AREA FLOOR DRAINS
SUMP P
SUMP Q
SUMP R
SUMP S
SUMP T
SUMP M
SUMP U
SUMP V
REACTOR BLDG SUMPS
AREA NW
AREA NE
AREA SW
AREA SE
SUMP A
SUMP B
SUMP C
SUMP D

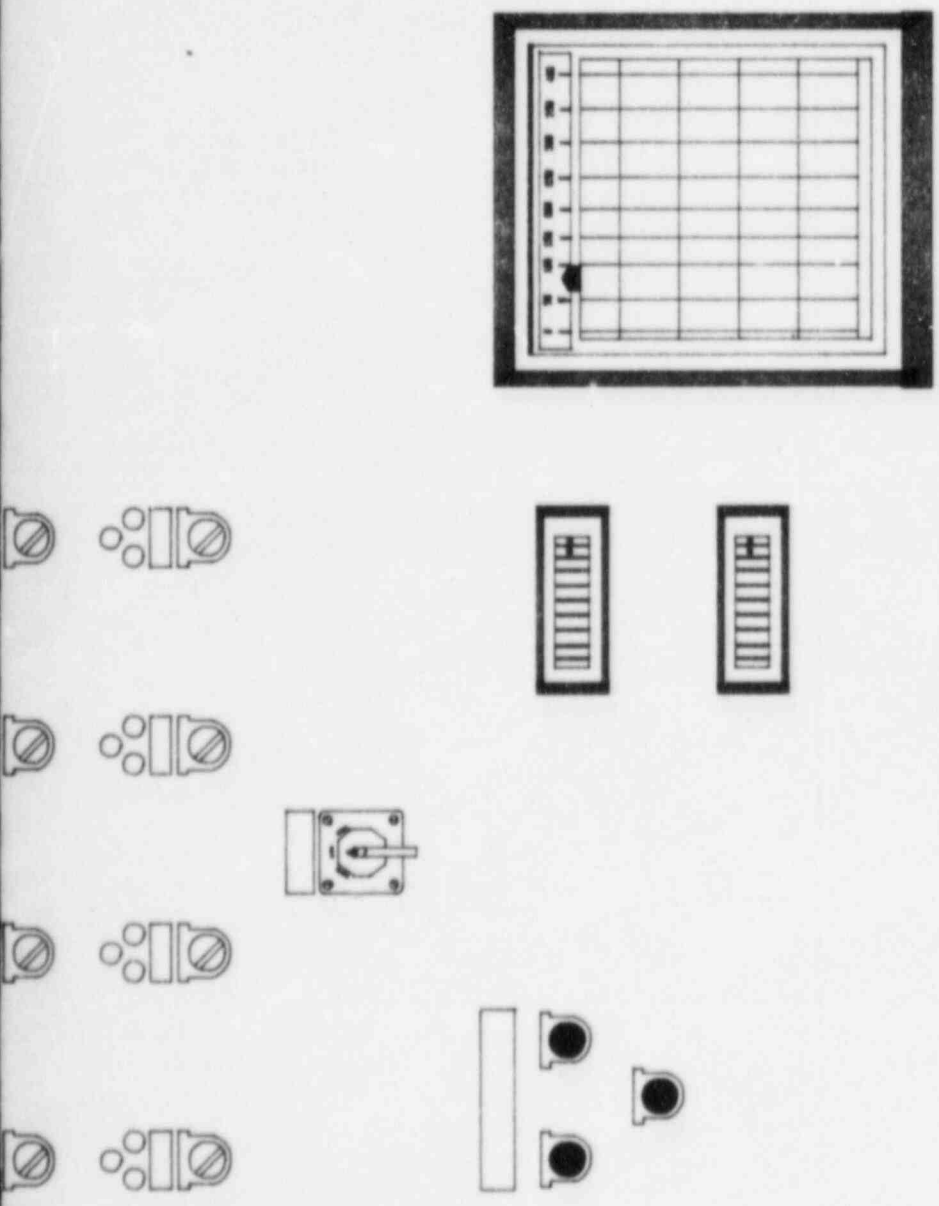
PANEL WITH ENHANCEMENTS AND MODIFICATIONS

FIG 6.4

TI APERTURE CARD

Also Available On Aperture Card





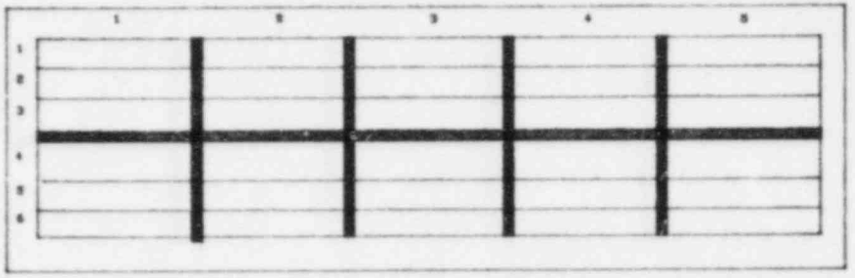
PANEL (VBD-J) AS IS

FIG 6.5

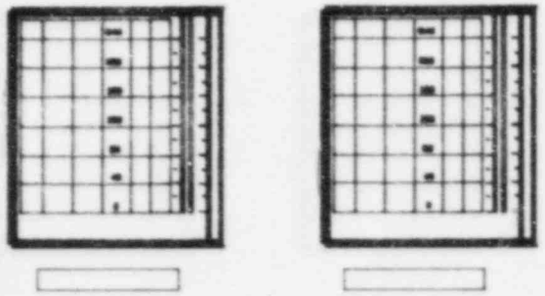
TI APERTURE CARD

Also Available On Aperture Card

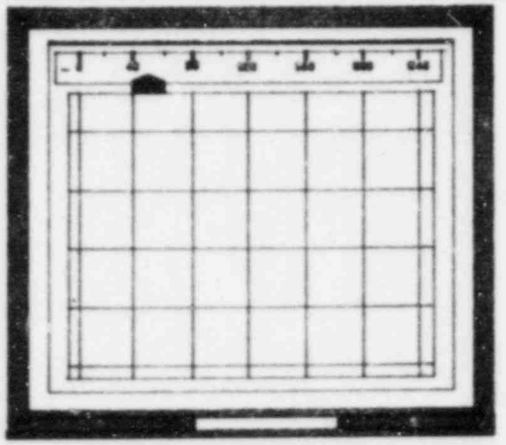
SUPPRESSION CHAMBER / PRESSURE RELIEF PANEL (VBD-J)



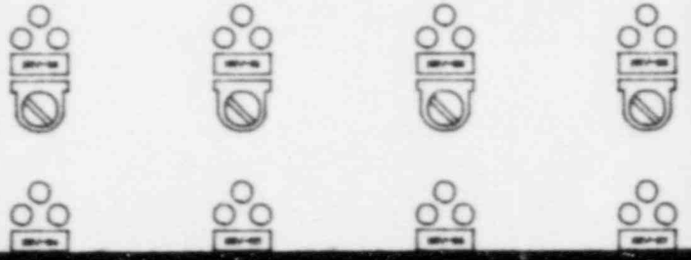
SUPPRESSION CHAMBER



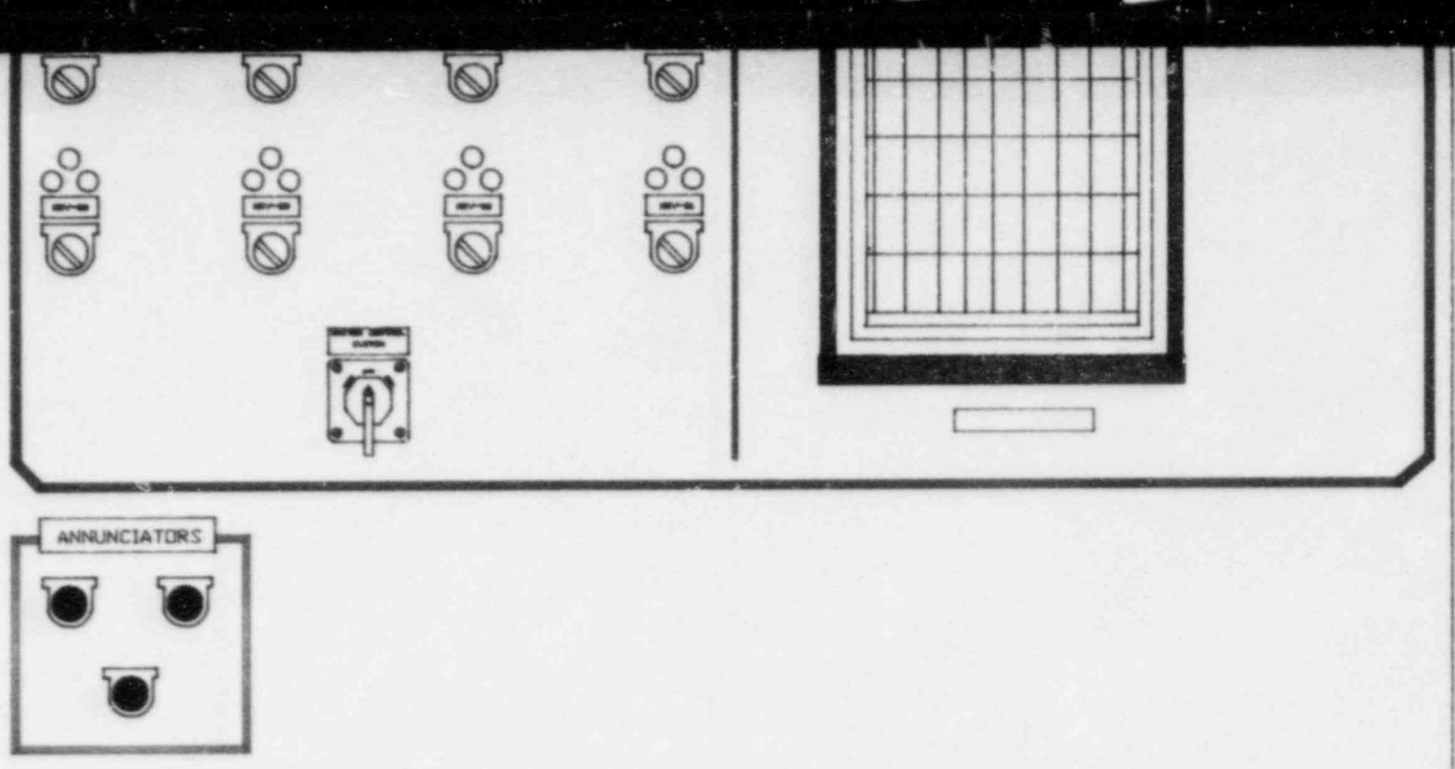
SUPPRESSION POOL



VACUUM RELIEF VALVES



AIR LOCK



PANEL WITH ENHANCEMENTS AND MODIFICATIONS

FIG 6.6

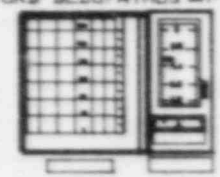
PANEL (VBD-R) AS IS

FIG 6.7

HEATING & VENTILATION CONTROL PANEL (VBD-R)

TURBINE BLDG

TURB BLDG/ATMOS ΔP



FILTER DRIVE

SUPPLY FANS

CONTROL BLDG

CONT BLDG/ATMOS ΔP

FILTER DRIVE

BATTERY FANS

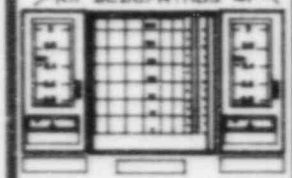
EMERG FLT FAN

A/C COMP

SUPPLY FANS

REACTOR BLDG

RX BLDG/ATMOS ΔP



FILTER DRIVE

PC VENTING

SUP FANS

EX B FANS

QUAD TEMPERATURES

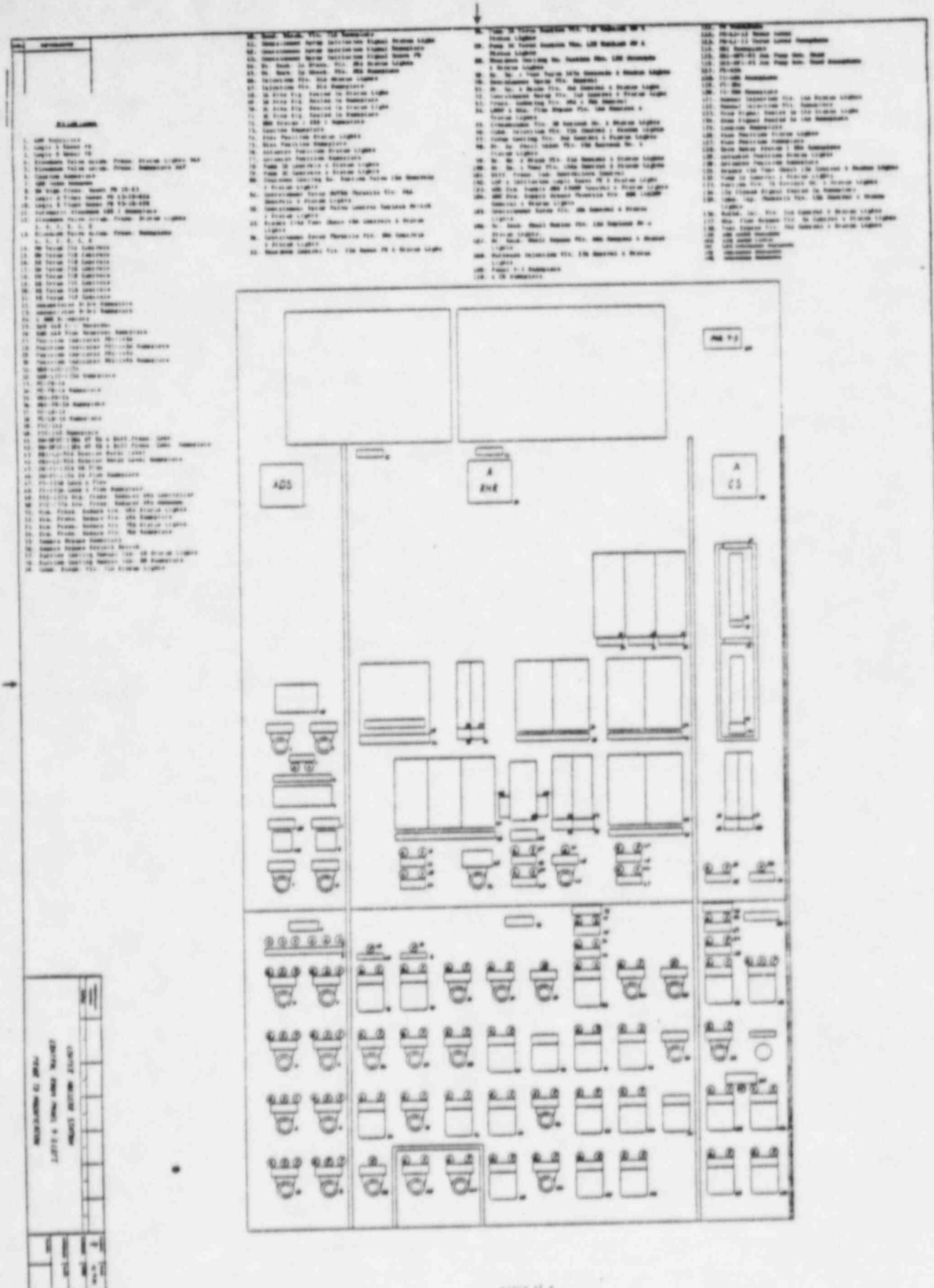
QUAD FANS

SECONDARY CONTMT ISOL VALVES

MG SET VENT VALVES

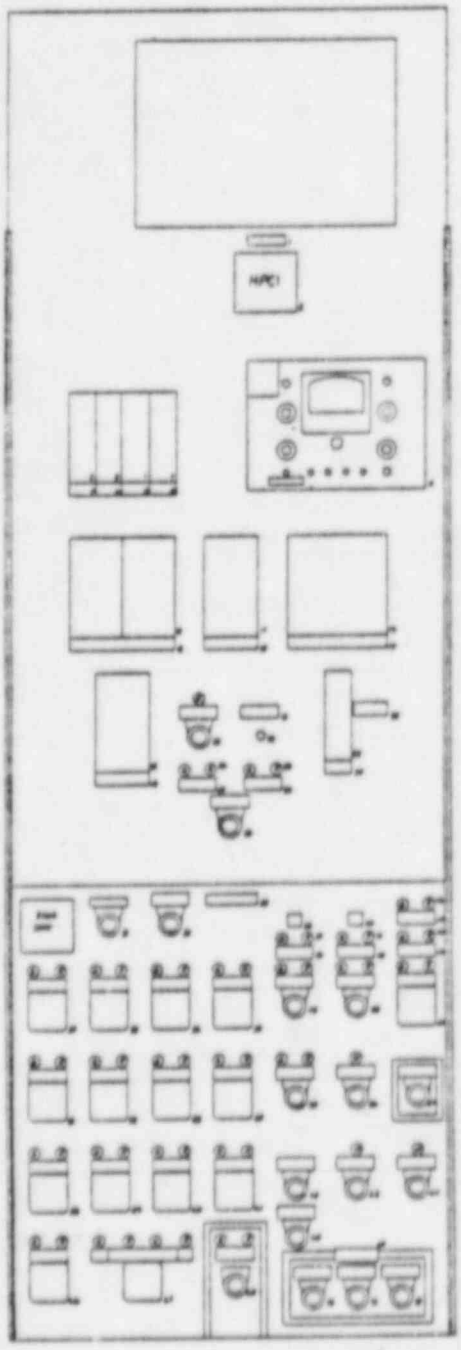
PANEL WITH ENHANCEMENTS

FIG 6.8



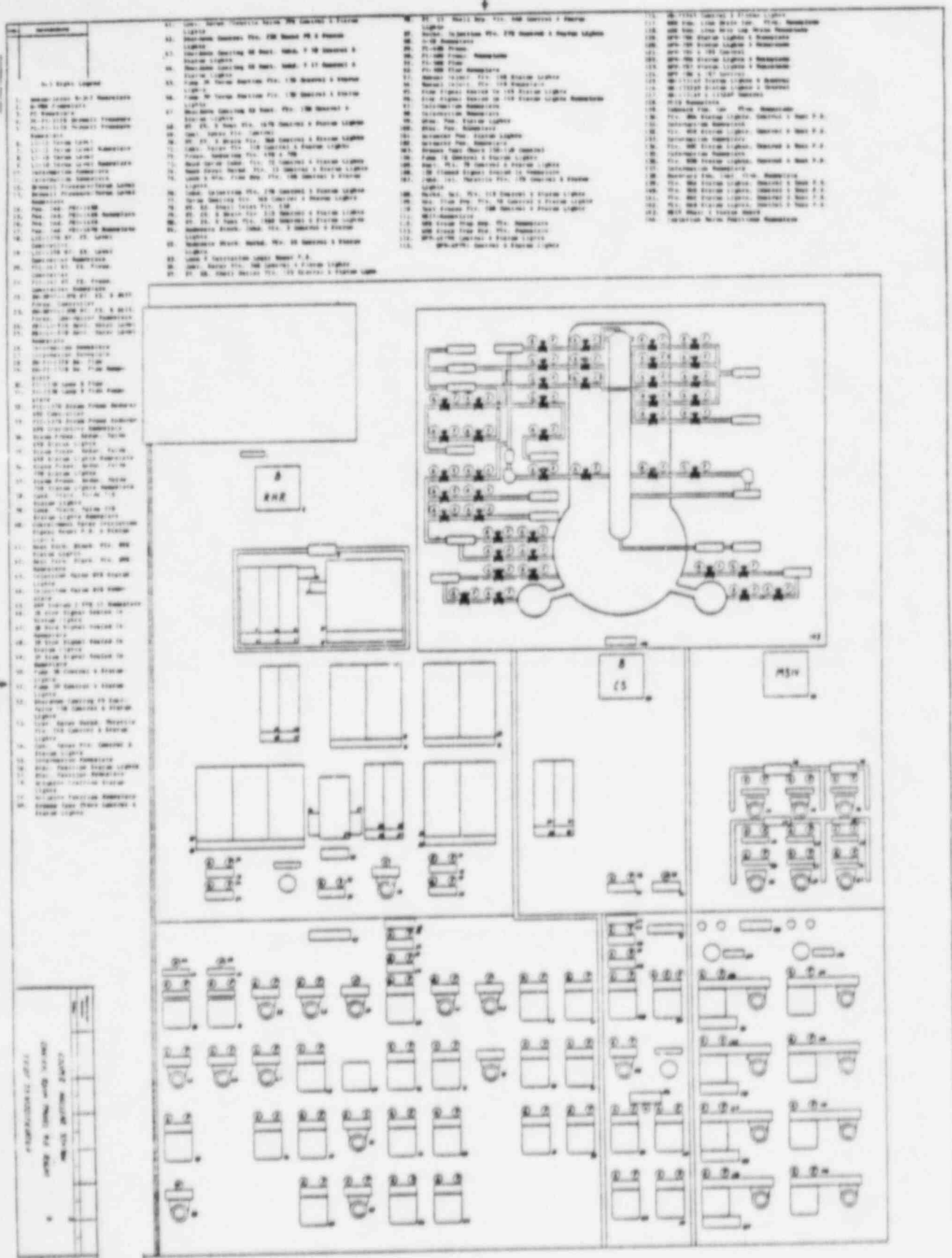
PANEL 9-3 (LEFT) AS IS

FIGURE 6.9, SHEET 1

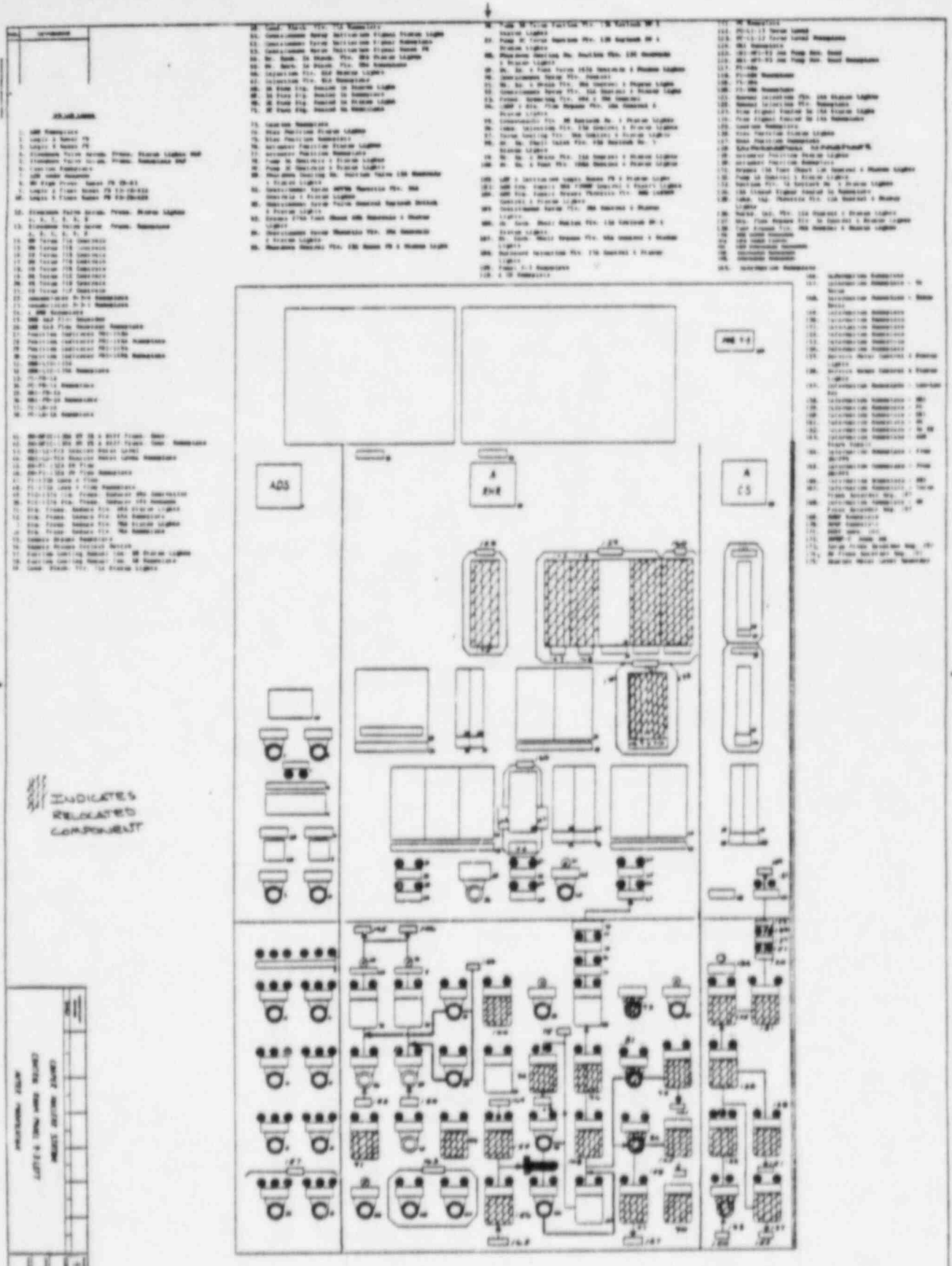


SCALE 1/2

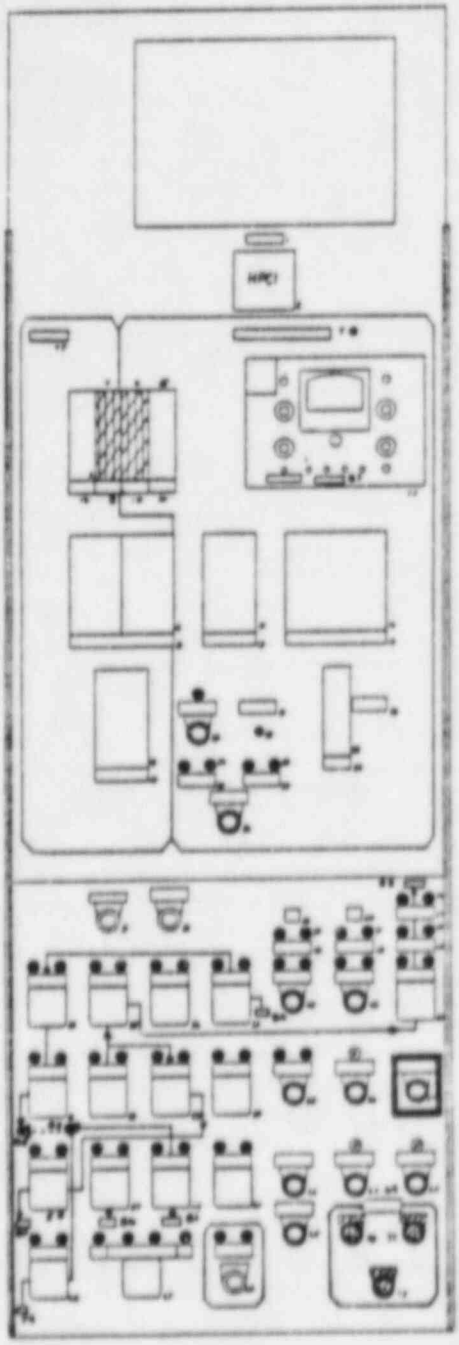
PANEL 9-3 (CENTER) AS IS
FIGURE 6.9, SHEET 2



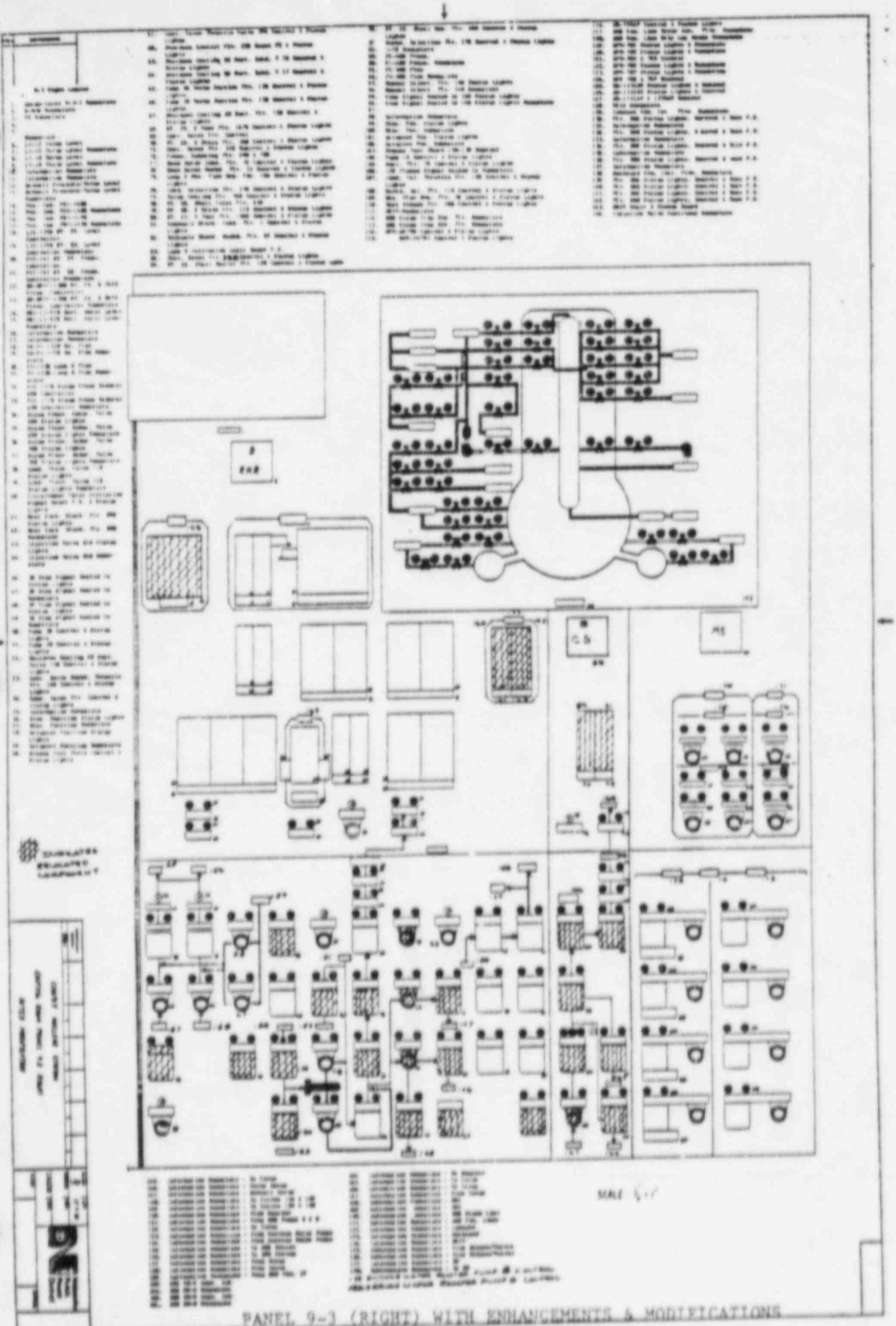
PANEL 9-3 (RIGHT) AS IS
FIGURE 6.9, SHEET 3



PANEL 9-3 (LEFT) WITH ENHANCEMENTS & MODIFICATIONS
FIGURE 6.10, SHEET 1



PANEL 9-3 (CENTER) WITH ENHANCEMENTS & MODIFICATIONS
FIGURE 6.10, SHEET 2



PANEL 9-3 (RIGHT) WITH ENHANCEMENTS & MODIFICATIONS

FIGURE 6.10, SHEET 3

REQUIREMENTS: 6.2 Results of Feasibility Studies For Modifying Back Panels

NRC REQUEST: The licensee should complete feasibility studies used to evaluate HEDs relating to Engineered Safety Feature (ESF) Systems information and ESF controls located on back panels; and provide documentation that describes the methodology and procedures used, Reference 12, P.5.

NPPD RESPONSE:

In CNS DCRDR summary report, NPPD noted that corrections of several complex HEDs will await the conduct of a feasibility study (FS) to identify resolution alternatives. These HEDs dealt mainly with: 1) panel layout, in that controls and displays are positioned beyond the recommended anthropometric limits, 2) controls and their feedback indications are far apart, 3) existing control arrangements do not allow the structuring of orderly flow paths among system components nor functional demarcation of related displays and controls.

Black and Veatch Engineering (B&V), has performed the feasibility studies for CNS control room, and developed arrangements to correct the placement related HEDs identified in CNS DCRDR (Ref. 10). B&V noted that although completely new panels are possible, they would not be economically practical. Instead, the FS report presented new arrangements that utilize the existing panel structure and only modify the front faces of the panels. These modifications relocate components on the existing panels such that they are within or near the human factors guidelines in NUREG-0700. Therefore, they are constrained by the existing panel structure and interior details. Figures 6.11, 6.12 and 6.13 give examples of the recommended corrections for the three panels: VBD-S, VBD-J and VBD-R. Other panel recommended corrections are given in Reference 3.2.

As noted in section 6.1 of this report, the DCRDR team is utilizing the results of the FS report in developing integrated enhancements and modifications for each of the panels, that address the HEDs and meet the station HF standards. Accepting in part or in full the recommendations of the FS report is the responsibility of the DCRDR team, and is decided upon through team evaluation of the severity of the HED, the benefits gained, and of the impact on operator training resulting from the change. Comparison of Figure 6.4 against 6.11 and Figures 6.6 against 6.12 shows how the DCRDR team is incorporating the results of FS in the development of panel enhancements and modifications.

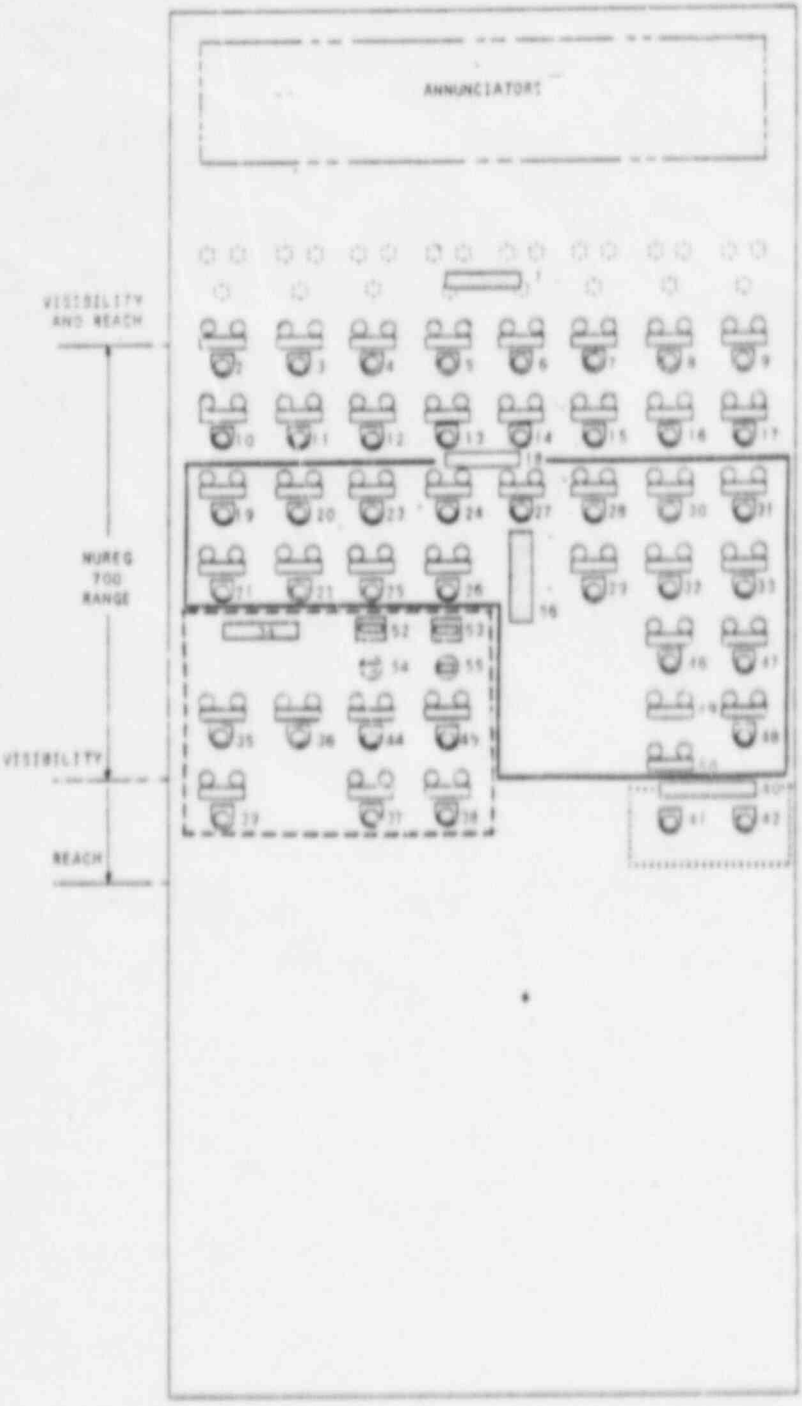
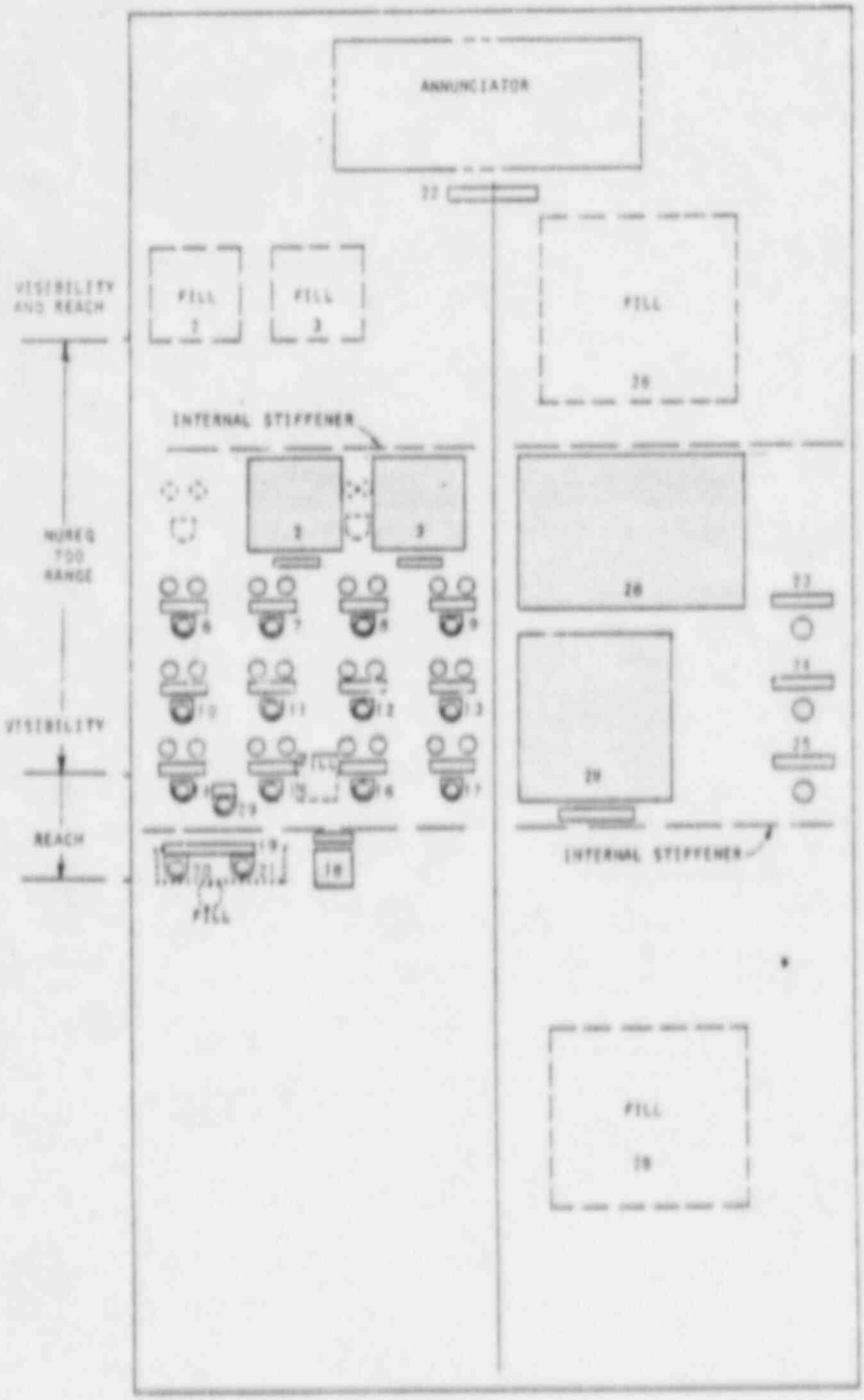


FIGURE 6.11 RECOMMENDED DESIGN CORRECTIONS FOR VBD-S



DENOTES ORANGE STRIP
INDICATES RELOCATED COMPONENTS
INDICATES FORMER COMPONENT LOCATION

PANEL VBD-'J' ARRANGEMENT OF PROPOSED MODIFICATIONS

FIGURE J

FIGURE 6.12 RECOMMENDED DESIGN CORRECTIONS FOR VBD-J

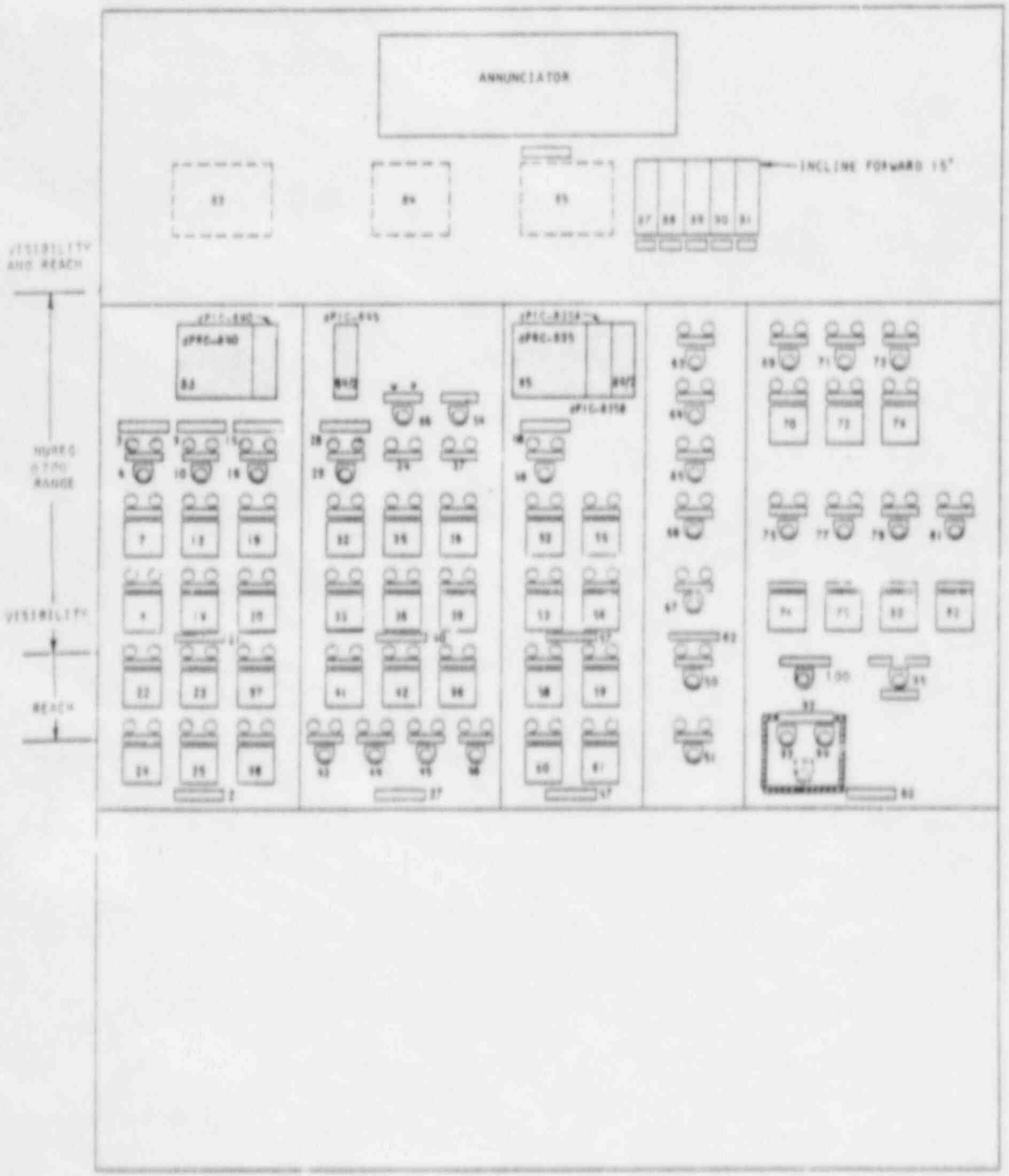


FIGURE 6.13 RECOMMENDED DESIGN CORRECTIONS FOR VBD-R

7. VERIFICATION THAT SELECTED DESIGN IMPROVEMENTS WILL PROVIDE NECESSARY CORRECTION, WITHOUT INTRODUCING NEW HED'S

REQUIREMENTS: Verification of Design Improvements

NRC REQUEST: The licensee should describe the process to be used to complete this activity, and provide the results in their Supplemental Summary Report, Reference 12, P.5.

NPPD RESPONSE:

Verification of the HED corrections constitutes an essential step in NPPD design improvements process, as noted in Figure 6.1. Verification of the design improvements will be accomplished in two phases:

1) Independent Design Verification, where the design verifier independently verifies the design change (DC) package, in accordance with the station DC procedure.

2) DCRDR Team Verification & Validation of Design Changes, where the DCRDR team members review the DC package, and ensure that the proposed changes incorporate CNS HF engineering standards, do not create new HEDs, and result in improving the operator/machine interface.

Appendix F gives the details of NPPD process of verification, validation and implementation instructions to be used in the DCRDR program.

8. COORDINATION OF CONTROL ROOM IMPROVEMENTS WITH CHANGES RESULTING FROM OTHER PROGRAMS SUCH AS SPDS, OPERATOR TRAINING, REG. GUIDE 1.97 INSTRUMENTATION

NRC ASSESSMENT: Although the schedules for NUREG-0737 activities have been coordinated, it is not apparent that NPPD has a positive program to ensure these activities happen in a coordinated manner. Additional coordination and interaction at the working level for these projects may be necessary to make the schedule come together, Reference 11, P.11.

RECOMMENDATIONS: 8.1 Coordination of SPDS, PMIS, DCRDR, RG 1.97, And EOPs at the Working Level

NRC REQUEST: Further Coordination of SPDS, PMIS, DCRDR, RG. 1.97, and EOPs at the working level should be considered, Reference 11, P.13.

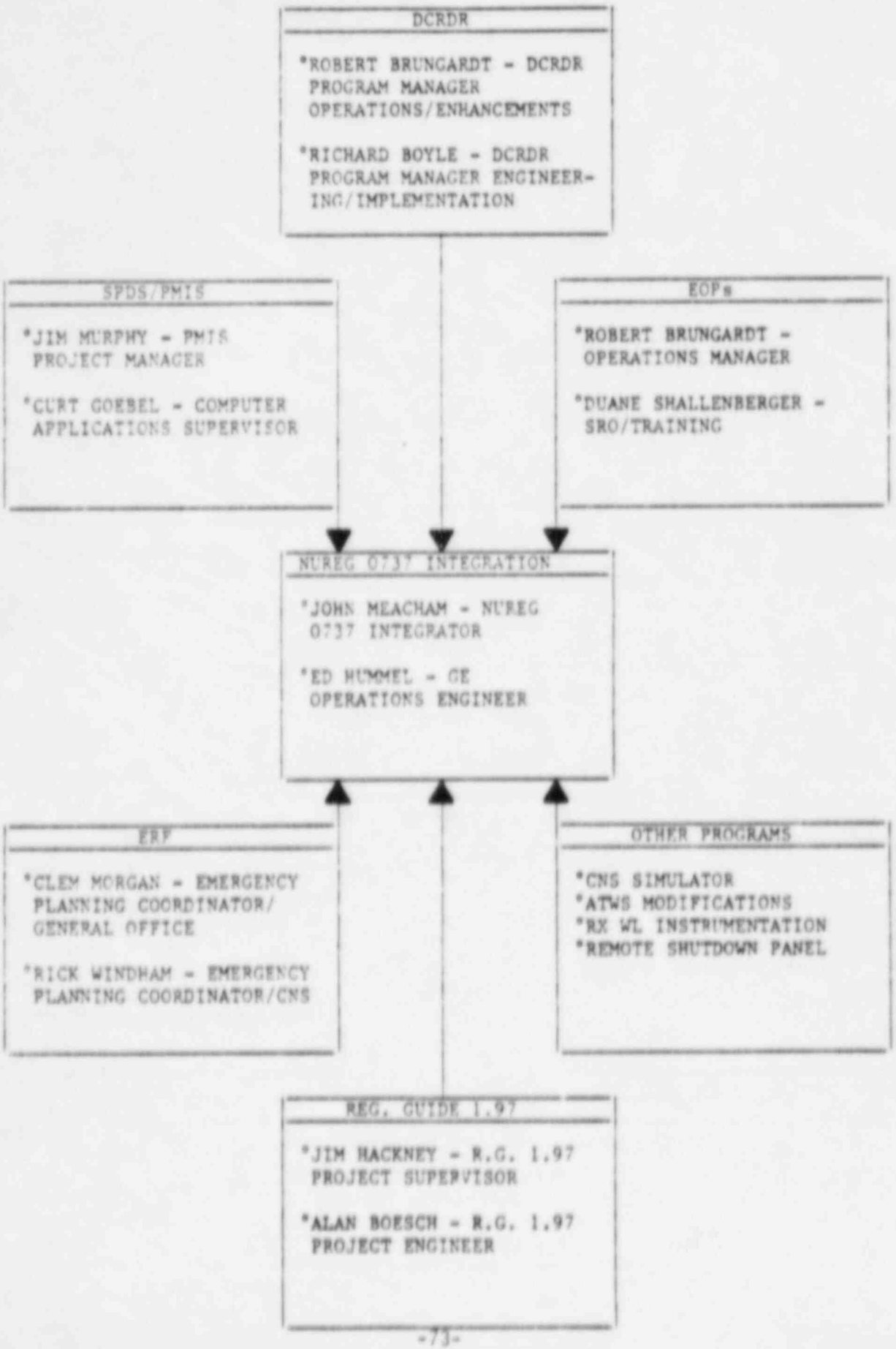
NPPD RESPONSE:

Integration of NPPD NUREG-0737 programs are placed under the CNS Technical Manager, who acts as the NUREG 0737 integrator, and has implemented a program to integrate these activities as noted in Figure 8.1. The Technical Manager is assisted in this program by an onsite General Electric Operations Engineer. NUREG-0737 meetings are held as needed at the working level to discuss interfacing tasks (Fig. 8.2) and program scheduling (Table 8.1).

Additional integration of the NUREG 0737 projects occurs at monthly DCRDR meetings in which representatives of the SPDS/PMIS, DCRDR, R.G. 1.97, and the EOPs projects are in attendance. The NUREG 0737 and DCRDR meetings being held ensure proper interaction and coordination of the NUREG 0737 projects.

FIGURE 8.1

INTEGRATION PROGRAM AND STRUCTURE FOR NUREG 0737 PROGRAMS



8. COORDINATION OF CONTROL ROOM IMPROVEMENTS WITH CHANGES RESULTING FROM OTHER PROGRAMS SUCH AS SPDS, OPERATOR TRAINING, REG. GUIDE 1.97 INSTRUMENTATION (CONT'D)

REQUIREMENTS: 8.2 Schedule updated of NUREG-0737, Supplement 1, Activities & Interrelationships Among Various Tasks

NRC REQUEST: An updated schedule for NUREG-0737, Supplement 1, activities should be included. This update shows the interrelationships among these tasks, Reference 11, P.13.

NPPD RESPONSE:

NPPD, in their issuance of the DCRDR summary report (Ref. 10) has included an implementation schedule of NUREG-0737 programs. Since the issue of the DCRDR supplement report, several activities have been completed. These include issue of R.G. 1.97, Revision 7 in December 1985, and implementation of the EOPs in August 1985. Operator training on the EOPs, SPDS and the future panel modifications is made an integral part of NUREG-0737 program activities. Table 8.1 gives the updated implementation schedule of NUREG-0737 programs.

The interfacing among NUREG-0737 programs and their relation to other on-going programs is shown in the flow chart of Figure 8.2. This figure identifies the interrelationships among the R.G. 1.97, DCRDR, EOPs, SPDS/PMIS, ERF and other programs of ATWS and reactor water level modifications, Remote shutdown panel, plant procedures other than the EOPs, USAR, and CNS simulator. Table 8.2 gives the description of these interrelationships. Many of these activities have been completed and discussed in various sections of this report. The status of the on-going activities is given in Table 8.2.

TABLE 8.1

Schedule

NUREG 0737 Supplement I Programs

Program	Activity	Date	Status
SPDS/PMIS	Submittal of SPDS Safety Analysis	March 1984	Complete
	SPDS Operable	July 1986	Estimated
DCRDR	Submittal of Program Plan	March 1984	Complete
	Submittal of Summary Report	February 1985	Complete
	Response to NRC In Progress Audit	April 1985	Complete
	Submittal of Supplement Report	February 1986	Complete
REG GUIDE 1.97	Submittal of Assessment Report	March 1984	Complete
	Submittal of R.G. 1.97 Response Revision 7	December 1985	Complete
	Implementation of Required R.G. 1.97 Modifications	Modifications Implemented Prior to March 1989	Estimated
EOPs	Submittal of Generic Technical Guidelines	December 1983	Complete
	Development of EOP Writers Guide	April 1984	Complete
	Submittal of Procedures Generation Package	June 1984	Complete
	Development of Plant Specific EPGs	July 1984	Complete
	Development of EOPs	July 1984	Complete
	Implementation of EOPs	August 1985	Complete
ERF	TSC Fully Functional	December 1986	Estimated
	EOF Fully Functional	December 1986	Estimated
	OSC Fully Functional	----	Complete

TABLE 8.1 (continued)

Schedule for NUREG 0737 Supplement I Programs (Continued)

Program	Activity	Date	Status
OPERATOR TRAINING	EOP Classroom and Simulator Training	April 1985	Complete
	SPDS/PMIS Training	December 1985	Complete
	Training on DCRDR Control Room Panel Modifications	Coordinated with Panel Modifications	----

TABLE 8-2
COOPER NUCLEAR STATION
INTERFACING TASKS AMONG NUREG-0737 PROGRAMS
LIST OF TASKS & STATUS

	Task Description	Status/Comments
(1)	Use EOP's as basis for DCRDR Task Analysis Report.	- Task completed and reported in DCRDR Summary
(2)	Integrate EOP's with remaining EP's and normal plant procedures.	- This task will be accomplished through inclusion of administrative statement in station procedures and/or the USAR.
(3)	Ensure consistent nomenclature between procedures and relabelled control boards.	- Panel Design Change (DC) Package will specify which procedures are affected by Panel Enhanc/Mod. Procedures will be updated concurrently with the implementation of design modifications.
(4)	Develop SPDS/PMIS Control Room Procedures	- A writer's guide defining how the SPDS could be utilized during drills and actual events will be developed by the station.
(5)	Perform Task Analysis on SPDS/PMIS Procedures required to support performance of EOP's.	- This task will be placed on hold pending receipt of NRC guidance (refer to Section 2.7 of this report).
(6)	Ensure compatability of SPDS functional structure with EOP's and plant system functions.	- Detailed description of SPDS displays demonstrates systematic compatability with the EOP's. Identification of EOP entry conditions to emergencies, and correspondence of SPDS safety functions with the EOP's control function will be investigated and corrections will be made.
(7)	Perform function and task analysis integrating DCRDR instrumentation with RG 1.97.	- This task will be accomplished through the completion of FT&A to identify instrument operability requirements on the EOPs and other procedures. (Refer to Section 1.1 of this report.)
(8)	Ensure Human Factor suitability of RG 1.97 instrumentation.	- Regulatory Guide 1.97 instrumentation has been subjected to control room survey under the DCRDR Program. An item-by-item HF Review of the instruments will be conducted, and the instruments will be labeled by a specific RG 1.97 symbol.

TABLE 8-2, cont'd
COOPER NUCLEAR STATION
INTERFACING TASKS AMONG NUREG-0737 PROGRAMS (continued)
LIST OF TASKS & STATUS

Task Description	Status/Comments
(9) Ensure consistent Human Factor principles between control room and SPDS/PMIS.	- This task will be accomplished through completion of the activities noted in Section 2.5 of this report.
(10) Apply Human Factor principles in the design of remote shutdown panel.	- The design of remoted shutdown panel will follow the HF Standards established for CNS control room. The DCRDR Team will verify the design before implementation.
(11) Apply F&TA to emergency procedures including station blackout procedures.	- This task will be accomplished through completion of the activities noted in section 2.5 of this report.
(12) Include RG 1.97 display information on the SPDS/PMIS.	- Plans are under way to equip the SPDS/PMIS with additional sensor points to meet the need of RG 1.97 and of the DCRDR F&TA for additional displayed information.
(13) Ensure conformance of modifications with HF Guidelines and compatability with CR instrumentation.	- Planned modifications of ATWS and reactor water level instrumentation in the control room will be integrated with DCRDR panel modification and will follow CNS HF Standards.
(14) Develop Class "A" Dose Assessment model on PMIS and necessary displays for ERF support.	- A class "A" dose assessment model for CNS is being developed by Dames & Moore, with an expected completion date of July 86. ERF will be equiped with the SPDS displays following testing and validation of model.
(15) Apply good HF Engineering in ERF design and ensure reliable communication with control room.	- Design update of the ERF will utilize NUREG-0700 for HF Guidelines. Reliability of communication with the control room will be ensured.
(16) Develop SPDS procedures in support of TSC and EOF.	- The SPDS Writer's Guide noted in item 4 above will address the use of SPDS in the TSC and EOF.

TABLE 8-2, cont'd
COOPER NUCLEAR STATION
INTERFACING TASKS AMONG NUREG-0737 PROGRAMS (continued)
LIST OF TASKS & STATUS

	Description	Status/Comments
(17)	Incorporate CR HF Engineering Standards and CR Enhanc/Modif. in simulator design.	- The simulator design will duplicate the upgraded control room panels resulting from the DCRDR enhancements/modifications.
(18)	Include DCRDR Program Summary in USAR.	- A summary of the DCRDR program and of the resulting control room modifications will be included in CNS USAR.
(19)	Identify enchancement items that require design modifications.	- Cooper plan for upgrading the control room is to develop a single Design Change (DC) package that addresses both the enhancements and modifications for each of the panels. Enhancements that require design modifications as an integral part of the DC package.
(20)	Resolve DCRDR HEDs through SPDS/PMIS.	- This task is being integrated with that of Item 12, for resolving the DCRDR F&IA HEDs through the SPDS/PMIS.
(21)	Verify design modifications in control room.	- This task is being addressed in Section 7.0 of this report.
(22)	Validate DCRDR systems' integration through walk-through of EOPs in CR without SPDS/PMIS.	- After a number of design modifications have been verified and/or implemented, validation will be performed by the DCRDR Team through walk-through of selected sections of the EOPs without availability of SPDS/PMIS.
(23)	Validate DCRDR systems' integration in CR with SPDS/PMIS.	- Same as Item 22 with availability of SPDS/PMIS.
(24)	Validate NUREG-0737 programs through dynamic simulation of critical events to CNS.	- Validation of NUREG-0737 program will be performed through dynamic simulation of critical scenarios on CNS simulator that is presently under construction.

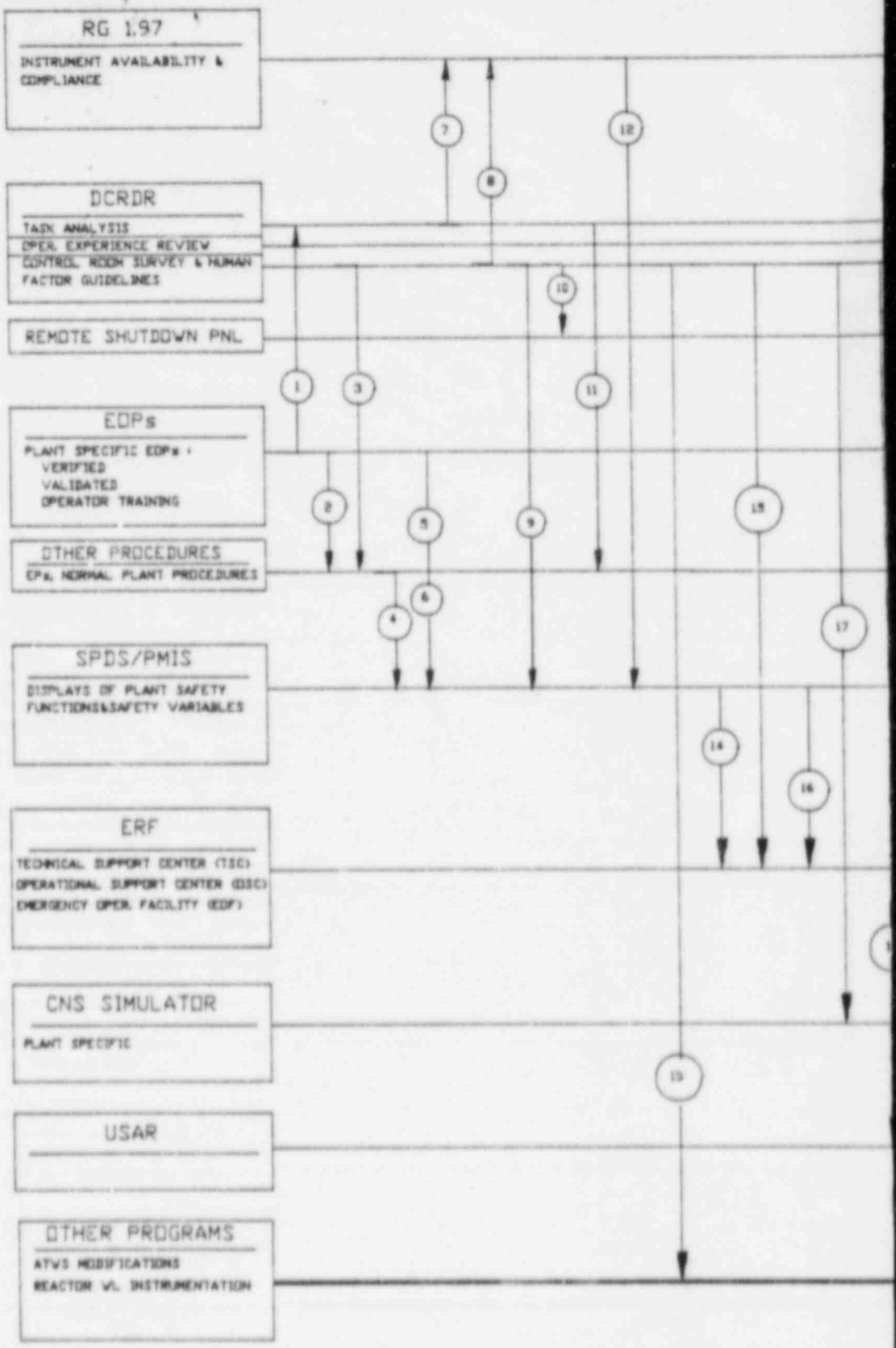
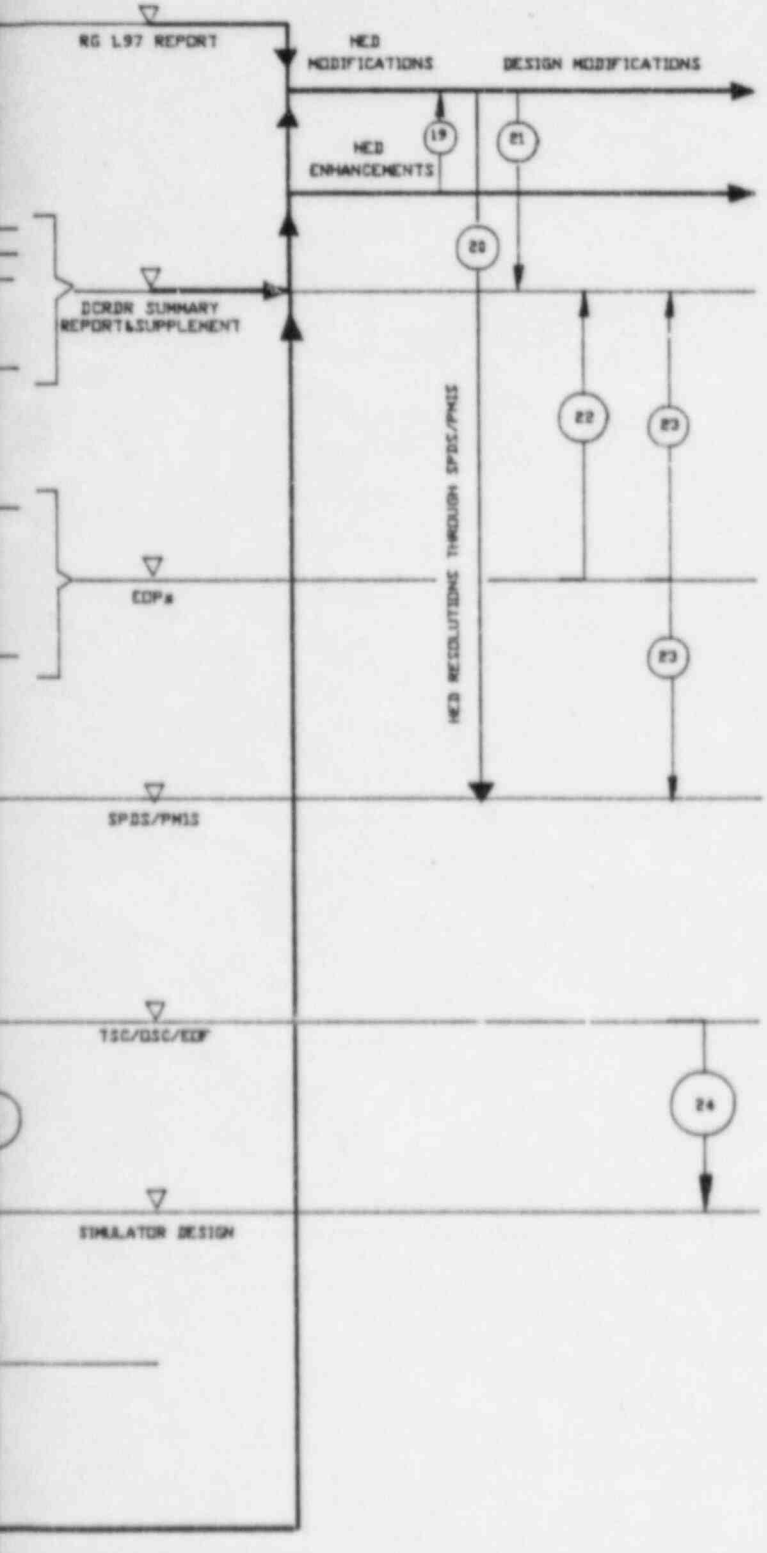


FIG 8.2 CNS INTERFACING TASKS AMON



G NUREG-0737 PROGRAMS

8. COORDINATION OF CONTROL ROOM IMPROVEMENTS WITH CHANGES RESULTING FROM OTHER PROGRAMS SUCH AS SPDS, OPERATOR TRAINING, REG. GUIDE 1.97 INSTRUMENTATION (CONT'D)

REQUIREMENTS: 8.3 Ensurance of Consistent Nomenclature Between Procedures and Relabeled Boards & Availability of RG. 1.97 Instrumentation Prior to EOP Implementation & Coordination of Training With Procedures and Hardware Changes

NRC REQUEST: As a part of the coordination of NUREG 0737, Supplement-1 activities, the summary report supplement should address:

Relabeling of control boards to establish nomenclature conventions happens concurrently with and are coordinated with procedure changes to ensure consistency between control boards and procedures; installation of R.G. 1.97 instrumentation required to support EOPs will be completed in time; and training will be adequately coordinated with procedure and hardware changes, Reference 11, P.11.

NPPD RESPONSE:

As noted in Section 8.1 of this report, the integration and coordination of NUREG-0737 programs are placed under CNS technical manager, assisted by an onsite General Electric Operation Engineer. CNS has identified these interfacing activities among various programs, as noted in section 8.2 of this report. Coordination of these activities is performed through NUREG-0737 meetings and issue of status reports.

In terms of the coordination between relabeling of control boards and procedure changes (item 3 of Figure 8.2), NPPD is utilizing its existing process of having the design change package for each of the panels specify those procedures that are affected by the design change. It is the responsibility of the design engineer, in charge of the panel DC, to ensure that the procedure update goes concurrently with the implementation of design changes on the panel.

With respect to the installation of R.G. 1.97 instrumentation and EOP implementation schedule, NPPD has notified the NRC that, with most of R.G. 1.97 instrumentation in place, implementation of the EOPs to be completed by August 1985 and that schedule was adhered to. As noted in Table 8.1, the implementation schedule of R.G. 1.97 modifications is prior to March 1989.

Operator training on the updated procedures and hardware changes will be scheduled in the same refueling outage as the panel modifications. Following the implementation of the hardware changes operator training will be accomplished by a walk-through of the operating procedures for these systems affected by the changes.

9. OTHER ITEMS

RECOMMENDATIONS:

9.1 Setting-Up A DCRDR Working File At NPPD

NRC REQUEST:

Copies of survey checklists, task analysis work sheets, and other DCRDR documentation should be obtained from General Electric and organized into a working file for use by NPPD team members and individuals and organizations responsible for HED correction modifications and other related efforts, Reference 11, P.13.

NPPD RESPONSE:

As a part of the ongoing activities on the DCRDR program, NPPD has set-up a DCRDR working file at the Cooper Nuclear Station. This file contains copies of the task analysis sheets, control room survey checklists, operating experience review, and the HED sheets. In addition, the DCRDR file contains copies of the meeting minutes, letters of communication, and summary status of NUREG-0737 interfacing programs. Copies of the enhanced panel drawings and the recommended design modification are also placed on file when issued. This file is being made available to personnel responsible for implementing the HED corrections.

Additional DCRDR files, containing copies of the HED sheets, detailed design and design change packages are kept at NPPD main offices in Columbus, Nebraska.

RECOMMENDATIONS: 9.2 Use of NUREG-0700 Checklist In Future Control Room Surveys

NRC REQUEST: Any portions of the Control Room Survey that are repeated or updated should make use of the NUREG-0700 checklists, Reference 11, P.13.

NPPD RESPONSE:

As noted in references 4 and 7, the BWROG control room survey checklist together with the supplement is considered, by the NRC, to constitute an acceptable method that can be used to fulfill the survey requirements of NUREG-0737, supplement 1. NPPD has used these checklists in their control room survey.

In documenting the discrepancies on the HED sheets (Appendix B) reference is made to the corresponding section of NUREG-0700, and the DCRDR team considered meeting NUREG-0700 guidelines as close as practical, keeping in mind the existing control room design. In addition, NPPD has developed human factor engineering standards and implementation guidelines for CNS control room (Appendix E) based on NUREG-0700 and more recent control room HF guidelines (Ref. 29-31). These developed HF standards for CNS are used to supplement the BWROG survey checklists during the development of panel enhancements and design modifications (Refer to section 6 of this report).

In future control room surveys or survey update, NPPD will continue to make use of NUREG-0700 checklists, as described above.

RECOMMENDATIONS: 9.3 Review of Operating Experience of Other BWRs

NRC REQUEST: The operating experience review should be extended to include experience at other BWRs similar to Cooper, Reference 11, P.13.

NPPD RESPONSE:

In Reference 10, the District described the operating experience review conducted by the DCRDR Core team for Cooper Nuclear Station. Copies of DCRDR Summary Reports from other utilities having BWR 4's of Cooper's control room configuration and design are being sought by the District and will be reviewed in detail by the DCRDR team to assess the applicability of operating experience of other plants to Cooper, when said reports are received.

RECOMMENDATIONS: 9.4 Maintaining Consistency Of Human Factor Standards Between Remote Shutdown Panels and Control Room

NRC ASSESSMENT/ REQUEST: NPPD is currently in the process of designing the remote shutdown capability for CNS. NPPD has committed to conduct a task analysis and human human factors survey for the remote shutdown panel design. It is particularly important that consistent conventions and nomenclature be maintained between the control room and remote shutdown equipment, Reference 11, P.11.

NPPD RESPONSE:

In the process of designing the alternate (remote) shutdown (ASD) panels, NPPD has issued the preliminary design drawings, identifying the controls and indications needed for plant shutdown outside the control room. The three issued panel drawings are for the following systems:

- Residual heat removal (RHR) pool cooling mode, with transfer switches from the control room to the panel
- High Pressure core injection (HPCI), with transfer switches from the control room to the panel
- Safety relief valves (SRVs) with transfer switches from the control room to the panel.

The DCRDR team performed a HF review of these design drawings to ensure good human factors have been used in the design and the ASD panel layouts are consistent with control room enhanced panels. The team recommendations consisted of:

- Relocating HPCI controls and indications to meet HF anthropometric limits
- Subgrouping of the controls for the HPCI turbine, HPCI pump and the RHR pool cooling mode, and development of orderly flow paths identifying systems' operation
- Inclusion of a mimic or an escutcheon identifying the positions of the SRV discharge pipes and the pool temperature sensors.
- Utilizing CNS HF standards for color coding, labeling, enhanced designs for meters, and recorders showing normal and abnormal ranges of operation, similar to the control room.

Following the completion of the final design drawings for the ASD panels, additional HF review and verification of the design changes will be performed.

10. REFERENCES

1. NUREG-0660, "NRC Action Plan Developed as a Results of the TMI-2 Accident," May 1980; Revision 1, August 1980.

2. NUREG-0737, Supplement 1, "Clarification of TMI Action Plan Requirements - Requirements for Emergency Response Capability (Generic Letter 82-33)," December 17, 1982.

3. "Response to NUREG-0737, Supplement 1, Emergency Response Capability, Cooper Nuclear Station," letter from J.M. Pilant (NPPD) to D.G. Eisenhut, (NRC) dated April 15, 1983.

4. "Program Plan for Detailed Control Room Design Review, Nebraska Public Power District, Cooper Station," dated February 1984; submitted by letter from J.M. Pilant, (NPPD) to D.G. Eisenhut (NRC) dated March 1, 1984.

5. NUREG-0700, "Guidelines for Control Room Design Review," September 1981.

6. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants;" Section 18.1, "Evaluation Criteria for Detailed Control Room Design Reviews (DCRDR)," September 1984.

7. "NRC Staff Review of the BWR Owners' Group (BWROG) Control Room Survey Program (Generic Letter 85-18)," Letter from D.G. Eisenhut (NRC) to BWR Licenseses, Applications and Construction Permit Holders, Dated April 19, 1983.

8. "Review of the Cooper Nuclear Station Detailed Control Room Design Review Program Plan Submittal," letter from D.B. Vassallo, (NRC) to J.M. Pilant, (NPPD), dated June 4, 1984.

9. "Detailed Control Room Design Review In-Progress Audit Report," (Ref. Audit conducted November 27-29, 1984), letter from D.B. Vassallo, (NRC) to J.M. Pilant (NPPD), dated March 20, 1985.

10. "NUREG-0737, Supplement 1 - Detailed Control Room Design Review (DCRDR) Summary Report," Letter from J.M. Pilant (NPPD) to D.B. Vassallo (NRC), dated February 4, 1985.

11. "Technical Evaluation Report (TER) Detailed Control Room Design Review, Nebraska Public Power District, Cooper Nuclear Station," Lawrence Livermore National Laboratory, March 26, 1985.

12. "Detailed Control Room Design Review (DCRDR) - Evaluation of Summary Report" Letter from D.B. Vassallo (NRC) to J.M. Pilant (NPPD), dated September 5, 1985, and Attachment.

13. "Detailed Control Room Design Review (DCRDR) In-Progress Audit Report Response," letter from J.M. Pilant (NPPD), to D.B. Vassallo (NRC), dated April 30, 1985.

14. "Reg. Guide 1.97", U.S. Nuclear Regulatory Commission, Rev. 2 and 3, Dated Dec. 1980 and May 1983.

15. "Regulatory Guide 1.97 Requirements for Cooper Nuclear Station", Letter from J.M. Pilant to R.M. Bernero (NRC) dated December 4, 1985.

16. "Reactor Protection System - Updated Safety Analysis Report" Cooper Nuclear Station, Vol. III Section 2.

17. "Compliance of Protection Systems to Industry Criteria and General Electric BWR Nuclear Steam Supply System", General Electric Company, Report No. NEDO-10139, June 1970.

18. "Criteria for Accident Monitoring Functions In Light-Water-Cooled Reactors," American Nuclear Society Report, ANSI/ANS-4.5-1980, Dec. 1980.

19. "Regulatory Guide 1.97 Requirements Relative to Nuclear Power Station As-Built Configuration, GE Report NSPD-088-1083, Nov. 1983.

20. "Instrument Accuracy - Component & Loop Data Accuracies" Cooper Nuclear Station C&I Manual References.

21. "NRC Clarification of DCRDR Function and Task Analysis", Conference Call from J. Weaver, D. Boyle, E. Hummel, M. Aburomia, M. Sparr, and J. Peaslee (NPPD), to E. Sylvester, N. Thompson, D. Tondi, and R. Ramirez (NRC), dated October 3, 1985.

22. "Emergency Operating Procedures", Cooper Nuclear Station Procedures No. 5.8, dated August 1985.

23. "Detailed Descriptions of the Displays For the Cooper Nuclear Station Safety Parameters Display System (SPDS)", Nebraska Public Power District, Plant Management Information System, Cooper Nuclear Station, Document No. 503-8500000-78, dated February 1985.

24. "Human Factors Plan SPDS Human Factors Plan, PMIS Human Factors Plan," Nebraska Public Power District Plant Management Information System, Cooper Nuclear Station, Document No. 503-8500000-77, dated April 1984.

25. "Human Factors Engineering Review of the Cooper Nuclear Station Console", Science Application International Corp., Memorandum dated November 2, 1984.

26. "Control Panel Indicating Lights Failure Detection Feasibility Study", Nebraska Public Power District, Project No. 12828, dated January 80.

27. "BWR Owners' Group Control Room Design Program Summary Report", General Electric Company, Report No. NEDC-30285, October 1985.

28. "NUREG-0737 Supplement 1 DCRDR Enhancement Schedule", Letter from J.M. Pilant (NPPD), to D.B. Vassallo (NRC), dated May 24, 1985.

29. "Human Engineering Guide For Enhancing Nuclear Control Room", EPRI Report No. EPRI NP-2411, dated May 1982.

30. "Human Factors Methods For Nuclear Control Room Design", EPRI Report No. EPRI NP-1118-SY, dated November 1979.

31. "Human Factors Guide For Nuclear Power Plant Control Room Development," Electric Power Research Institute, Report No. EPRI-NP-365, dated August 1984.

32. "Control Panel Modifications Feasibility Study", Nebraska Public Power District, Project 11674, August 1985.

APPENDIX A

TASK ANALYSIS DATA SHEETS

CNS DCRDR

TASK ANALYSIS DATA SHEET

PROCEDURE

Title: Reactor Pressure Vessel (RPV) No. EOP-1

Classification: Emergency Operating Procedures (EOP's)

Rev. 1 Date 8/1/85

DCRDR TEAM

R. Gardner, M. Weinstein, M. Aburomia (Origin. analysis)

J. Peaslee, J. Sawinara, M. Aburomia (Final analysis)

Procedure Step	Entry Conditions/Operator Actions per EOP's	Controls and Information Needs/Characteristics	O A C	Control Room Inventory: Device/Location	Control Room Inventory: Associated Devices/ Location	Suitability	Notes
Entry Conditions	- RPV water level below 12.5 inches, OR unknown	1. A signal alerting operator to low WL approaching (or reaching) 12.5 inches. - Signal setpoint above or at 12.5 inches.	RA & RT	A1. Alarm 3-3, "Rx Level High/Low: at 27.5 inches/Panel 9-5-1.	A2. Alarm 3-1, "Rx Vessel Low Level Trip" at 12.5 inches/ Panel 9-5-2	Y	
		2. An indication confirming magnitude of Rx WL - Indication range varying from NWL to a value below 12.5 inches with Normal/Emergency regions identified. - Units in inches - Accuracy: 20 inches (Marking of Setpoint Required) - Oper. Reqmts: Category 1, or RPS	R or CR the 12.5 inches value	I1. Level Indicators: RFC-LI-94A&B&C (0-60 inches)/Panel 9-5 (1), (2) I3. Shutdown Range Indicator NBI-LI-86 (0-400)/Panel 9-4 (1)	I2. WR Level Indicators NBI-LI-85A&B (-150 to +60 in)/Panel 9-5 (1),(2) I4. WL Recorder RFC - LR/PR-97/Panel 9-5 (1), (2), (3)	N	(1) Identify the zero reference for each indication (2) Identify normal/emerg. ranges (3) Paper scale does not agree with recorder scale

CNS DCRDR

TASK ANALYSIS DATA SHEET

PROCEDURE

DCRDR IEAM

Title: Reactor Vessel (RPV)
Classification: Emergency Operating Procedures (EOP's)
Rev. 0 Date 8/1/85

No. EOP:1

R. Gardiner, M. Weinstein, M. Aburomia (Origin. analysis)
J. Peaslee, J. Seminara, M. Aburomia (Final analysis)

Control Room Inventory Device ID	Instrument Operability: RG 1.97 Instruments Y/N	Instrument Operability: RG 1.97 Instruments Type/Categ.	Instrument Operability: Suitability Y/N	Instrument Accuracy: Loop Acc.	Instrument Accuracy: Min (Req'd) Acc.	Instrument Accuracy: Min. Scale Interval	Instrument Accuracy: Suitability Y/N	Notes
Coolant Level In Reactor		A-1						(1) Existing reactor WL instrumentation does not meet RG 1.97 requirements. NPPD will provide IE wide range/fuel zone instrumentation covering the range from 60 inches to -150 inches 16" below the bottom of active fuel. (Ref. 15). Implementation is in accordance with NPPD's response to Generic Letter 84-23. Implementation during the 1988 outage.
		B-1						
I1. Narrow Range Water Level Indicators:								
RFC-LI-94A	N			± 2.4%	1.4"	1"	Y	
RFC-LI-94B	N			"		"		
RFC-LI-94C	N			"		"		
I2. Wide Range Level Indicators:								
NBI-LI-85A	N		Y(1)	± 6.5%	14.0"	15"	N(2)	
NBI-LI-85B	N			"	"	"		
I3. Shutdown Range Indicator:								(2) Scale interval exceeds required accuracy.
NBI-LI-86	Y		Y	2.4%	10.0"	10"		
I4. WL Recorder								(3) Level recorder covers same range as narrow range water level indicators
RFC-LR/PR-97	N			± 2.4% Same as I1 (3)	Same as I1	Level 1"	Y	

CWS DCRDR

TASK ANALYSIS DATA SHEET

PROCEDURE

DCRDR IEAM

Title: Reactor Pressure Vessel Control

No. EOP-1

R. Gardiner, M. Weinstein, M. Aburomia (Origin. analysis)
J. Peaslee, J. Seminara, M. Aburomia (Final analysis)

Classification: Emergency Operating Procedures (EOP's)

Rev. 0 Date 8/1/85

Procedure Step	Entry Conditions/Operator Actions per EOP's	Controls and Information Needs/Characteristics	O A C	Control Room Inventory: Device/Location	Control Room Inventory: Associated Devices/ Location	Suitability	Notes
Entry Conditions	- RPV pressure above 1045 psig.	1. Alert signal at or less than 1045 psig. - Signal setpoint less than or equal to 1045 psig	RA & RT	A1. Alarm 2-1 "Reactor Vessel High Pressure Trip" at 1045 psig/Panel 9-5-2	A2. Alarm 2-3 "Reactor Pressure High", at 1025 psig/Panel 9-5-1	Y	
		2. Indication confirming value of Rx pressure. - Indication range covering Rx normal press to a value above 1045 psig, with normal/emergency regions identified. - Units in psig - Accuracy: 75 psig (Marking of setpoint required) - Oper. Reqmts: Category 1, or RPS	R or CR the 1045 psig value	I1. RFC -PI-90A&B&C (0-1200 psig)/Panel 9-5 (1),(2),(3)	I2. Pressure Recorders NBI-PR-2A &2B/Panel 9-3, 9-4 (1), (2) I3. Pressure Recorder RFC-LR/PR-97/Panel 9-5 (1), (2)	N	(1) Identify normal/emergency regions (2) Mark the 1045 psig on the scale (3) Scale of RFC-PI-90C not in agreement with A&B channels.

PROCEDURE

DCRDR TEAM

Title: Reactor Vessel (RPV)
Classification: Emergency Operating Procedures (EOP's)
Rev. Date 6/1/85

No. EOP-1

R. Gardiner, M. Weinstein, M. Aburomia (Origin. analysis)
J. Peaslee, J. Seminara, M. Aburomia (Final analysis)

Control Room Inventory Device ID	Instrument Operability: RG 1.97 Instruments Y/N	Type/Categ.	Suitability Y/N	Instrument Accuracy: Loop Acc.	Min (Req'd) Acc.	Min. Scale Interval	Suitability Y/N	Notes
Reactor Coolant Sys. Press.		A-1						(1) NPPD will comply in
		B-1						implementing Category 1
		C-1						(Ref. 15) for the loop
								components. Modifications
I1. Pressure Indicators								scheduled for 1986 and 1988
								outages.
RFC-PI-90A	N			± 2.5%	30 psig	20 psig	Y	
RFC-PI-90B	N			"	"	"		(2) Pressure recorder covers
RFC-PI-90C	N			"	"	"		the same range as narrow
								range pressure indicators
I2. Pressure Recorders								RFC-PI-90A&B&C.
NBI-PR-2A	Y		Y(1)	± 1.25%	20 psig	20 psig	Y	
NBI-PR-2B	Y					"		
I3. Pressure Recorder								
RFC-LR/PR-97	N			± 0.9% for Press.	30 psig (2)	20"	Y	

CNS DCRDR

TASK ANALYSIS DATA SHEET

PROCEDURE

Title: Reactor Pressure Vessel (RPV) Control

No. EOP-1

Classification: Emergency Operating Procedures (EOP's)

Rev. Date 8/1/85

DCRDR TEAM

R. Gardner, M. Weinstein, M.Aburomia (Origin. analysis)
J. Peaslee, J. Seminara, M. Aburomia (Final analysis)

Procedure Step	Entry Conditions/Operator Actions per EOP's	Controls and Information Needs/Characteristics	O A C	Control Room Inventory: Device/Location	Control Room Inventory: Associated Devices/ Location	Suitability	Notes
Entry Conditions	- Drywell pressure above 2.0 psig.	1. Alert signal at or below 2 psig. - Signal setpoint less than or equal to 2 psig.	RA & RT	A1. Alarm 2-3 "Primary Containment High Pressure Trip" at 2 psig/Panel 9-5-2	A2. Alarm 6-2 "Drywell High/Low Pressure" at > 1.45 psig and < 1.05 psig/Panel 9-5-2	Y	
		2. Indication confirming value of DW pressure. - Indication range covering DW normal pressure to a value above 2 psig with Normal/Emergency regions identified. - Units in psig - Accuracy: 0.4 psig - Oper. Reqmts: Category 1, or RPS	R or CR the 2.0 psig value	I1. Prim. Cont. Press.* Recorders PC-PR-1A&B -5 to +5 psig/Panel 9-3, 9-4 (1), (2), (3)	I2. PC-PR-513 (0-2.0 psig) Back panel/VBD-H (1), (2) I3. PC-PI-512B (0-80 psia)/Panels 9-4 (4)		(1) Mark the 2.0 psig on recorder, scales (2) Identify normal/emergency regions. (3) Indicator range needs improvement. (4) Process units not consistent with procedures, psia should be psig.

PROCEDURE

Title: Reactor Vessel (RPV)
Classification: Emergency Operating Procedures (EOP's)
Rev. Date 8/1/85

No. EOP-1

DCRDR TEAM

R. Gardiner, M. Weinstein, M. Aburomia (Origin. analysis)
J. Peaslee, J. Seminara, M. Aburomia (Final analysis)

Control Room Inventory Device ID	Instrument Operability: RG 1.97 Instruments: Y/N	Instrument Operability: RG 1.97 Instruments: Type/Categ.	Instrument Operability: Suitability Y/N	Instrument Accuracy: Loop Acc.	Instrument Accuracy: Min (Req'd) Acc.	Instrument Accuracy: Min. Scale Interval	Instrument Accuracy: Suitability Y/N	Notes
Drywell Pressure		A-1						(1) NPPD will seisaic qualify the instrument to meet RG 1.97 Reqts. Implementation scheduled during 1986 & 1988 outage.
		B-1						
I1. Primary Containment Pressure Recorder								
PC-PR-1A	Y		Y(1)	± 1.75%	.2 psig	.1 psig	Y	(2) NPPD will add two channels for trend recording on Panels 9-3 & 9-4. Implementation scheduled during 1988 outage.
PC-PR-1B	Y							
I2. Primary Containment Pressure Recorders								
PC-PR-513	N							
I3. Primary Containment Pressure Recorders								
PC-PI-512B	Y		Y(2)	± 1%	0.02 psig	0.02 psig		

TASK ANALYSIS DATA SHEET

PROCEDURE

Title: Reactor Pressure Vessel Control
Classification: Emergency Operating Procedures (EOP's)
Rev. 0 Date 8/1/85

No. EOP-1

DCRDR TEAM

R. Gardner, M. Weinstein, M. Aburomia (Origin. analysis)
J. Peaslee, J. Seminara, M. Aburomia (Final analysis)

Procedure Step	Entry Conditions/Operator Actions per EOP's	Controls and Information Needs/Characteristics	O A C	Control Room Inventory: Device/Location	Control Room Inventory: Associated Devices/ Location	Suitability	Notes
Entry Conditions	- A condition which requires reactor scram:	- Rx Scram Information		I1. Scram Group A&B Indication lights + 1,2,3,4/Panel 9-5-2 (1)		N	(1) Information of Rx Scram received when indicating lights go off.
	a. MSIV closure	a1. Alert signal identifing scram demand resulting from MSIV closure.	RA RT	A1. Alarm 1-2 "Main Steam Isolation Valves(s) not Fully Open Trip"/Panel 9-5-2		Y	(2) Subsystem labeling for INBD MSIV's needed.
						N	(3) Subsystem labeling for OUTBD MSIV's needed
		a2. Indication confirming valve closure - Valve switches position indicating lights (IL) labeled OPEN/CLOSE or analog valve position meter - Units % Open - Accuracy: N/A - Oper. Reqmts: Category I, or RPS	DI	I1. ILs (R/B) for Inboard MSIV's 80 A,B,C,D /Panel 9-3 (2)	I2. ILs (R/B) for Outboard MSIV's 86A,B,C,D /Panel 9-3 (3)		

TASK ANALYSIS DATA SHEET

PROCEDURE

Title: Reactor Vessel (RPV)
Classifications: Emergency Operating Procedures (EOP's)
Rev. Date 8/1/85

No. EOP-1

DCRDR TEAM

R. Gardiner, M. Weinstein, M. Aburomia (Origin. analysis)
J. Peaslee, J. Seminara, M. Aburomia (Final analysis)

Control Room Inventory Device ID	Instrument Operability Reqts: R6 1.97 Instruments Y/N	Type/Categ.	Suitability Y/N	Instrument Accuracy: Loop Acc.	Min (Req'd) Acc.	Min. Scale Interval	Suitability Y/N	Notes
Primary Containment Isolation Valve Position		B-1						(1) NPPD will seisaic qualify the instruments on Panel 9-3 to the levels established in the original plant seisaic criteria of NEDO-10678. Implementation scheduled during the 1986 and 1988 outages.
I1. ILs on MSIV Inboard Switches								
MS-AO-80A	Y		Y(1)		N/A			
MS-AO-80B								
MS-AO-80C								
MS-AO-80D								
I2. ILs on MSIV Outboard Switches								
MS-AO-86A	Y		Y(1)		N/A			
MS-AO-86B								
MS-AO-86C								
MS-AO-86D								

APPENDIX B

HUMAN ENGINEERING DISCREPANCY (HED) SHEETS

B.1 PANEL 9-3 (FRONT PANEL) HED SHEETS

B.2 VBD-S (BACK PANEL) HED SHEETS

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	6
HED NO:	6S
DESCRIPTION:	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A2.2
PEF:	9
HUMAN FACTOR TOPIC:	NEED FOR LOCATION AIDS
NUREG-0700 SECTION:	6.6.6.1, 6.6.6.2, 6.8.1.3 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING
SUBSYSTEM:	HPCI, NBI AND PRIMARY CONTAINMENT
COMPONENT ID:	HPCI PUMPS AND TURBINE INSTRUMENTATION, NBI & PC INSTRUMENTATION.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	PHOTO PANEL 9-3
HED RESOLUTION:	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	*OPERATOR PERFORMANCE CAN BE ENHANCED THRU USE OF LOCATION AIDS SUCH AS DEMARCATION, COLOR, AND MIMICS. LINES OF DEMARCATION CAN BE USED TO ENCLOSE FUNCTIONALLY RELATED DISPLAYS. SHOULD BE VISUALLY DISTINCT FROM PANEL BACKGROUND & PERMANENTLY ATTACH

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	270
HED NO:	1SS
DESCRIPTION:	LACK OF MIMICS INTEGRATING SYSTEM COMPONENTS.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A2.4 & A2.11
PEF:	6
HUMAN FACTOR TOPIC:	USE OF MIMICS
NUREG-0700 SECTION:	6.6.6.4, 6.8.2.2 *
PANEL ID:	9-3
RELATED SYSTEM (S):	CORE STANDBY COOLING SYSTEM (CSCS)
SUBSYSTEM:	RHR,CS,HPCI
COMPONENT ID:	RHR MODES OF OPERATION, HPCI TURBINE & PUMPS, CS PUMP SWITCHES
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENCHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	PHOTO PANEL 9-3
HED RESOLUTION:	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* MIMICS INTEGRATE SYSTEM COMPONENTS INTO FUNCTIONALLY ORIENTED DIAGRAMS THAT REFLECT COMPONENT RELATIONSHIPS. PROPERLY DESIGNED MIMICS SHOULD DECREASE THE OPERATOR'S DECISION MAKING LOAD.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	11
HED NO:	11S
DESCRIPTION:	SUBGROUPS WITHIN SYSTEM ARE NOT PROPERLY LAID-OUT SO THAT FLOW PATHS CAN BE EASILY CONSTRUCTED.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A2.7,A2.11,
PEF:	9
HUMAN FACTOR TOPIC:	USE OF MIMICS
NUREG-0700 SECTION:	6.6.6.4, 6.8.2.2 *
PANEL ID:	9-3
RELATED SYSTEM (S):	CORE STANDBY COOLING SYSTEM (CSCS)
SUBSYSTEM:	RHR,CS,HPCI
COMPONENT ID:	RHR MODES OF OPERATION, HPCI TURBINE & PUMPS, CS SWITCHES
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	INTEGRATE WITH HED 6S. STANDARDIZE COLOR & SHAPE OF CONTROLS. INCLUDE IN FEASIBILITY STUDY OF HED GR.1.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* CONTROLS & DISPLAYS SHOULD BE PLACED WITHIN LOCATION WHICH PROMOTES EFFICIENT PROCEDURES, SAFE OPERATION, MAX. OPERATOR AWARENESS OF CURRENT CONDITION. ACHIEVED BY: A) GROUPING BY TASK SEQUENCE B) GROUPING BY SYSTEM FUNCTION C) IMPORTANCE/FREQ.OF

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	272
HED NO:	355
DESCRIPTION:	ADS RELIEF VALVE CONTROLS OUT OF CONSISTENT SEQUENCING.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A3.2
PEF:	6
HUMAN FACTOR TOPIC:	LOGICAL ARRANGEMENT & LAYOUT
NUREG-0700 SECTION:	6.8.2.2 *
PANEL ID:	9-3
RELATED SYSTEM (S):	RPV
SUBSYSTEM:	AUTOMATIC DEPRESSURIZATION SYSTEM (ADS)
COMPONENT ID:	VALVE SWITCHES 71A,B,C,E,G,H
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	OPENING SEQUENCE OF ADS VALVES IS MORE SIGNIFICANT THAN VALVE ARRANGEMENT. LABELS FOR VALVE OPENING SEQUENCE WILL BE PLACED ON TOPS OF SWITCHES' COVERS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* ARRANGEMENT OF CNTRLS SHOULD BE LOGICAL, AND NOT COMPROMISE SEQUENCE OF OPERATION OR FUNCTIONAL INTEGRITY. OPERATOR EXPECTATIONS WILL BE MET WHEN COMPONENTS HAVE A LEFT-TO-RIGHT OR TOP-TO-BOTTOM ARRANGEMENT, IDENTIFIED IN ALPHANUMERIC SEQUENCE.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	279
HED NO:	12SS
DESCRIPTION:	INCONSISTENT SEQUENCING OF ANNUNCIATOR BOXES
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A3.2
PEF:	4
HUMAN FACTOR TOPIC:	LOGICAL ARRANGEMENT AND LAYOUT
NUREG-0700 SECTION:	6.8.2.2 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING SYSTEMS
SUBSYSTEM:	ANNUNCIATOR BOXES
COMPONENT ID:	ANNUCIATOR BOXES ARRANGEMENT: 9-3-4,9-3-1,9-3-2,9-3-3,
IMPLEMENTATION ACTION:	NO ACTON
TYPE OF CORRECTION:	OTHER MOD
PRIORITY OF MODIFICATION:	III
SCHEDULE FOR IMPLEMENTATION:	NONE
REFERENCES:	PHOTO PNL 9-3,
HED RESOLUTION:	NO SAFETY RISK. ALARM PROCEDEDURES ARE SEPARATE FOR EACH BOX, AND ARE ATTACHED TO EACH SUBSECTION OF THE PANEL. ANNUNCIATOR BOX WILL BE MADE MORE VISIBLE THROUGH DISTINCTIVE LABELING.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* ARRANGEMENT OF CNTRLS & DISPLAYS SHOULD BE LOGICAL; SHOULD NOT COMPROMISE SEQUENCE OF OPERATION OR FUNCTIONAL INTEGRITY. OPERATOR EXPECTATIONS WILL BE MET WHEN COMPONENTS ARE IDENTIFIED ALPHA/NUMERIC LEFT-TO-RIGHT OR TOP-TO-BOTTOM ARRANGEMENT

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	15
HED NO:	15S
DESCRIPTION:	GROUPINGS OF CONTROLS AND DISPLAYS OF SIMILAR FUNCTIONS NOT APPARENT
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A3.3
PEF:	9
HUMAN FACTOR TOPIC:	ARRANGEMENT OF CONTROLS & DISPLAYS
NUREG-0700 SECTION:	6.8.2.1, 6.9.2.1
PANEL ID:	9-3
RELATED SYSTEM (S):	CORE STANDBY COOLING SYSTEM
SUBSYSTEM:	RESIDUAL HEAT REMOVAL SYSTEM (RHR)
COMPONENT ID:	RHR SWITCHES FOR VARIOUS MODES OF OPERATIONS
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	PHOTO PANEL 9-3
HED RESOLUTION:	INTEGRATE WITH HEDs 6S & 11S.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	18
HED NO:	185
DESCRIPTION:	STRINGS AND MATRICES OF COMPONENTS OF SIMILAR FUNCTIONS NOT DIFFERENTIATED BY DEMARCATION OR HIERARCHICAL LABELING.
HED SOURCE:	CR SURVEY
CPS CHECKLIST:	A3.4, A5.7,
PEF:	9
HUMAN FACTOR TOPIC:	LABELS AND LOCATION AIDS
NUREG-0700 SECTION:	6.6.1.2, 6.6.6.2 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & PRIM. CONTAINMENT COOLING SYSTEM
SUBSYSTEM:	HPCI AND PRIMARY CONTAINMENT INSTRUMENTATION
COMPONENT ID:	HPCI PUMP AND TURBINE INSTRU. LABELING. PC & NBI LABELS.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	INTEGRATE WITH HED 65 AND 155. NEW LABELING SHOULD BE MERGED WITH EXISTING LABELS IN HIERARCHICAL FORM.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* CONTROLS & DISPLAYS THAT MUST BE LOCATED, IDENTIFIED, OR MANIPULATED SHOULD BE APPROPRIATELY & CLEARLY LABELED. TO REDUCE CONFUSION, OPERATOR SEARCH TIME, AND REDUNDACY, A HIERARCHICAL LABELING SCHEME SHOULD BE USED.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	48
HED NO:	48S
DESCRIPTION:	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A3.7,SA3,
PEF:	9
HUMAN FACTOR TOPIC:	CONTROL - DISPLAY INTEGRATION
NUREG-0700 SECTION:	6.4.2.2,6.5.1.6,6.6.6.4 *
PANEL ID:	9-3
RELATED SYSTEM (S):	CORE STANDBY COOLING SYSTEMS
SUBSYSTEM:	RHR
COMPONENT ID:	1) CONTROL SWITCHES S29A AND S40A FOR HX PARALLEL VENT VALVES 166A AND 167A ARE TOO FAR APART FOR A-RHR 2) SAME AS 1) FOR B-RHR. (SEE SEPARATE PAGE)
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	INTEGRATE WITH HED 11S FOR POSSIBILITY OF RELOCATING CONTROLS & INDICATIONS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* CONTROLS SHOULD BE LOCATED SO AS TO BE EASILY RELATED TO FUNCT. & FUNCTIONAL GROUPINGS. CNTRLS OF SIMILAR FUNCT. SHOULD BE IN THE SAME LOCATION FROM PANEL TO PANEL. OTHER METHODS OF ASSOCIATION BETWEEN CONTROLS & DISPLAYS ARE COLOR & LABEL CODING.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	21
HED NO:	21S
DESCRIPTION:	NO PLANT STANDARD EXISTS FOR COLOR CODING.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A4.1
PEF:	12
HUMAN FACTOR TOPIC:	COLOR CODING
NUREG-0700 SECTION:	6.3.1.6 *
PANEL ID:	ALL PANELS
RELATED SYSTEM (S):	CONTROL ROOM
SUBSYSTEM:	PROCEDURES
COMPONENT ID:	COLOR CODING STANDARDS
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	DEVELOP CONTROL ROOM COLOR CODING AS A PART OF CNS HUMAN FACTOR ENGINEERING STANDARDS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	*COLOR AS A CODING MEDIUM IN CONTROL ROOMS PROVIDES UNAMBIGUOUS, EASILY DISCRIMINABLE INFORMATION TO THE OPERATOR. IT AIDS IN PERCEPTION OF WARNING SIGNALS, IDENTIFICATION OF FUNCTIONAL RELATIONSHIPS, AND ASSOCIATION OF OF DISPLAYS TO RELATED CNTRLS

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	22
HED NO:	22S
DESCRIPTION:	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A4.2,A4.3,
PEF:	9
HUMAN FACTOR TOPIC:	COLOR CODING
NUREG-0700 SECTION:	6.5.1.6, 6.5.2.3, 6.6.6*
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING
SUBSYSTEM:	RHR
COMPONENT ID:	COMPONENT LABELING, CAUTION LABELS
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	5
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION, MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC.COLOR CODING.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	*USE OF COLOR AS A CODING MEDIUM OFFERS A VALUABLE MEANS OF PROVIDING UNAMBIGUOUS, EASILY DISCRIMINABLE INFO. TO THE OPERATOR. COLOR CODING AIDS IN THE PERCEPTION OF WARNING SIGNALS, IDENT. OF FUNCT. RELATIONSHIPS & THE ASSOC. OF DISPLAYS TO CONTROLS

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	271
HED NO:	2SS
DESCRIPTION:	LACK OF LABELS FOR IDENTIFYING COMPONENT FUNCTION AND POWER SUPPLY TO INSTRUMENTS.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A5.1,
PEF:	6
HUMAN FACTOR TOPIC:	LABELING INFORMATION
NUREG-0700 SECTION:	6.6.1.1, 6.6.3.1
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING
SUBSYSTEM:	HPCI, RHR, CS
COMPONENT ID:	1)METER & RECORDER INDICATIONS MISSING POWER SUPPLY IDENT. 2) TURBINE VIBRATION METER FOR HPCI LACKS LABEL ID. 3) RHR FLOW RECORDER FR-143 HAS NO LABEL IDENTIFYING COMPONENT FUNCTION
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	IDENTIFY POWER SUPPLY SOURCE ON METERS AND RECORDERS. CORRECT LABELS IDENTIFICATION.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	273
HED NO:	6SS
DESCRIPTION:	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A5.5
PEF:	6
HUMAN FACTOR TOPIC:	LABELS WORD SLECTION, CONSISTENT, SYMBOLS
NUREG-0700 SECTION:	6.6.3.2, 6.6.3.3, 6.6.3.4 *
PANEL ID:	9-3
RELATED SYSTEM (S):	RHR, HPCI
SUBSYSTEM:	RHR, HPCI
COMPONENT ID:	1) RHR VALVES 17 & 18 USE V FOR VALVES. 2) ISOL VLV A039 USE PMP FOR PUMP
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STANDARDS, THAT INCLUDE LABELING AND LIST OF STANDARD ABBREVIATIONS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* THE WORDS EMPLOYED IN THE LABEL SHOULD EXPRESS EXACTLY WHAT ACTION IS INTENDED. A LIST OF STANDARD NAMES, ACRONYMS, ABBREVIATIONS, AND PART/SYSTEM NUMBERS SHOULD BE IN PLACE AND ADMINISTRATIVELY CONTROLLED.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	275
HED NO:	8SS
DESCRIPTION:	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A5.10
PEF:	6
HUMAN FACTOR TOPIC:	LABELING INFORMATION
NUREG-0700 SECTION:	6.6.2.1, 6.6.3.1 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR COOLING
SUBSYSTEM:	RHR's
COMPONENT ID:	1)NO DISTINCTION BET.DW AND SP SPRAY VALVES 31A&38A. AND 31B & 38B. 2)LABEL FOR RHR LEVEL PERMISSIVE MANUAL OVERRIDE SWITCH NOT SUCCINCTLY WORDED.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* LABELS SHOULD DESCRIBE FUNCT.OF EQUIP.ITEMS. WORDS EMPLOYED IN LABEL SHOULD EXPRESS EXACTLY WHAT ACTION IS INTENDED. LABELS SHOULD BE CONSISTENT WITHIN AND ACROSS PIECES OF EQUIPMENT IN THEIR USE OF WORDS, ACRONYMS, ABBREVIATIONS,& PART/SYS NO.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	44
HED NO:	44S
DESCRIPTION:	ANNUCIATOR PANELS CAN BE SEEN BUT NOT READ FROM POSITIONS OTHER THAN DIRECTLY IN FRONT OF PANELS.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A7.3
PEF:	9
HUMAN FACTOR TOPIC:	ANNUNCIATORS - VISUAL TILE READABILITY
NUREG-0700 SECTION:	6.3.3.5, 6.3.3.1 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING SYSTEMS
SUBSYSTEM:	ANNUNCIATORS
COMPONENT ID:	ANNUNCIATOR TILES
IMPLEMENTATION ACTION:	NO ACTION
TYPE OF CORRECTION:	OTHER MOD.
PRIORITY OF MODIFICATION:	III
SCHEDULE FOR IMPLEMENTATION:	NONE
REFERENCES:	
HED RESOLUTION:	OPERATOR HAS TO WALK TO PANEL TO SILENCE ALARM, WHERE HE CAN READ ANNUNCIATOR TILE. (REFER TO COMMENTS)
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* THE OPERATOR SHOULD BE ABLE TO READ ALL OF THE ANNUNCIATOR TILES FROM THE POSITION AT THE WORK STATION WHERE THE ANNUNCIATOR ACKNOWLEDGE CONTROL IS LOCATED.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	57
HED NO:	57S
DESCRIPTION:	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B2.1
PEF:	9
HUMAN FACTOR TOPIC:	ZONE MARKING
NUREG-0700 SECTION:	6.5.2.3 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING
SUBSYSTEM:	PRIMARY CONTAINMENT
COMPONENT ID:	PRIMARY CONTAINMENT PRESSURE & LEVEL METERS & RECORDERS. PC-PR-1A&2A, PC-LI-13, PC-PI-512, PC-LI-12
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* ZONE MARKINGS SHOULD BE USED TO SHOW OPERATIONAL IMPLICATIONS OF VARIOUS READINGS SUCH AS "OPERATIONAL RANGE", "UPPER LIMITS", "LOWER LIMITS", AND "DANGER ZONE". ZONE MARKINGS SHOULD BE CONSPICUOUS AND DISTINCTIVELY DIFFERENT FOR DIFFERENT ZONES.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	280
HED NO:	13SS
DESCRIPTION:	INSTRUMENTS ARE NOT SCALED IN PROCESS UNITS RELATING TO SYSTEM OPERATION.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B2.3
PEF:	6
HUMAN FACTOR TOPIC:	USABILITY OF DISPLAYED VALUES
NUREG-0700 SECTION:	6.5.1.2 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING SYSTEMS
SUBSYSTEM:	HPCI, DW
COMPONENT ID:	1) UNIDENTIFIABLE PROCESS UNITS FOR HPCI PUMP PI-116, SHOULD BE PSIG. 2) DW PRESSURE METER & RECORDER PC-PI-512B & PC-PR-512A, PROCESS UNITS SHOULD BE PSIG OTHER THAN PSIA.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	SCALE CHANGES SHOULD BE PERFORMED BY MINOR DESIGN CHANGE. ENSURE APPROPRIATE CALIBRATION & SURVEILLANCE PROCEDURES ARE UPDATED. ENSURE APPROPRIATE OPERATOR TRAINING WILL BE CONDUCTED.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* SCALE UNITS SHOULD BE CONSISTENT WITH THE DEGREE OF PRECISION & ACCURACY NEEDED BY THE OPERATOR. ALL DISPLAYS SHOULD INDICATE VALUES IN A FORM IMMEDIATELY USABLE BY THE OPERATOR WITHOUT REQUIRING MENTAL CONVERSION.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	277
HED NO:	10SS
DESCRIPTION:	INDICATOR DESIGN DOES NOT FOLLOW CONVENTIONAL PATTERN.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B2.6
PEF:	B
HUMAN FACTOR TOPIC:	6.5.2.1 *
NUREG-0700 SECTION:	INDIC.POINTER MOVEM'T ON SCALE
PANEL ID:	9-3
RELATED SYSTEM (S):	HPCI
SUBSYSTEM:	HPCI TURBINE
COMPONENT ID:	HPCI TURBINE SPEED INDICATION SI-2792, POINTER MOVES DOWNWARD TO INDICATE INCREASE IN SPEED.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	2ND REFUELING
REFERENCES:	
HED RESOLUTION:	REPLACE METER
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* SCALE VALUES SHOULD INCREASE WITH UPWARD MOVEMENT OF THE POINTER.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	291
HED NO:	1455
DESCRIPTION:	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B2.12
PEF:	6
HUMAN FACTOR TOPIC:	SCALE MARKING
NUREG-0700 SECTION:	6.5.2.5 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING SYSTEM
SUBSYSTEM:	RHR, PC
COMPONENT ID:	1) RHR-FI-133A&B, 24 GRADUATIONS. 2) HPCI-PI-109 & 111, 14 GRADUATIONS. 3) PC-LI-13, 19 GRADUATIONS. 4) RHR-FR-143, 19 GRADUATIONS.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	REPLACE SCALES PER CNS STANDARDS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* SCALES FOR QUANTITATIVE READING SHOULD BE PROVIDED WITH GRADUATIONS CONSISTENT WITH THE PROGRESSION OF THEIR NUMERALS. NO MORE THAN 9 GRADUATIONS SHOULD SEPARATE NUMERALS.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	77
HED NO:	77S
DESCRIPTION:	ALARM POINTS NOT IDENTIFIED ON RECORDERS.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B3.3
PEF:	12
HUMAN FACTOR TOPIC:	ZONE MARKING
NUREG-0700 SECTION:	6.5.2.3
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING
SUBSYSTEM:	PRIMARY CONTAINMENT PRESSURE RECORDERS
COMPONENT ID:	PC-PR-1A & PC-PR-2A
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	INTEGRATE WITH HED 88S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	88
HED NO:	88S
DESCRIPTION:	RECORDER SCALES NOT MARKET TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B3.15
PEF:	12
HUMAN FACTOR TOPIC:	ZONE MARKING
NUREG-0700 SECTION:	6.5.2.3
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING
SUBSYSTEM:	PRIMARY CONTAINMENT
COMPONENT ID:	PC-PR-1A ,PC-PR-2A
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOPs OR RECORDER SCALES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	ZONE MRKGS SHOULD BE USED TO SHOW OPERATIONAL IMPLICATIONS OF VARIOUS READINGS SUCH AS "OPERATIONAL RANGE", "UPPER LIMITS", "LOWER LIMITS", OR "DANGER ZONE". ZONE MRKGS SHOULD BE CONSPICUOUS & DISTINCTIVELY DIFFERENT FOR DIFFERENT ZONES.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	282
HED NO:	1555
DESCRIPTION:	INDICATING LIGHTS DO NOT INDICATE POSITIVE STATE OR POSITIVE RESPONSE. EXTINGUISHED LIGHT MEANS VALVE IS ACTUATED.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B4.2
PEF:	6
HUMAN FACTOR TOPIC:	CHARACTERISTICS OF INDICATING LIGHTS
NUREG-0700 SECTION:	6.5.3.1 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR
SUBSYSTEM:	SAFETY RELIEF VALVES (S/RV)
COMPONENT ID:	S/RV BLUE BULBS
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	2ND REFUELING
REFERENCES:	
HED RESOLUTION:	CORRECTIONS SHOULD BE MADE IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* SYSTEM/EQUIPMENT STATUS SHOULD BE INFERRED BY ILLUMINATED INDICATORS, AND NEVER BY THE ABSENCE OF ILLUMINATION.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	98
HED NO:	98S
DESCRIPTION:	NO POSITIVE MEANS OF DIAGNOSING FAILED INDICATING LIGHTS AVAILABLE.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B4.4
PEF:	8
HUMAN FACTOR TOPIC:	PROVISION FOR LAMP FAILURE
NUREG-0700 SECTION:	6.4.3.3,6.5.3.1 *
PANEL ID:	ALL PANELS
RELATED SYSTEM (S):	CONTROL ROOM PANELS
SUBSYSTEM:	ANNUNCIATORS
COMPONENT ID:	INDICATING LIGHTS
IMPLEMENTATION ACTION:	REASSESS PER NRC REQU. 9-5-85
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	III
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	EXISTING ANNUNCIATOR SYS AT CNS INCORPORATE TEST CAPABILITIES SO NO ACTION IS REQUIRED. FOR STATUS INDICATING LIGHTS REDUNDANT INDICATIONS ARE AVAILABLE TO DISTINGUISH FAILED LIGHTS. FOR PANEL 9-5, CONTROL ROD POSITIONS WILL BE IDENTIFIED ON SPDS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* FOR ANNUNCIATOR SYSTEM, A CONTROL TO TEST AUDITORY AND FLASHING OF ALL TILES SHOULD BE PROVIDED. FOR INDICATING LIGHTS WHICH REFLECT A CONTROL STATUS, A LAMP TEST, OR DUAL LAMP/DUAL FILAMENT CAPABILITY SHOULD BE PROVIDED.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	276
HED NO:	955
DESCRIPTION:	INDICATING CONTROLLER DOES NOT FOLLOW CONVENTIONAL PATTERN.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B5.1
PEF:	6
HUMAN FACTOR TOPIC:	HUMAN SUITABILITY OF CONTROLS
NUREG-0700 SECTION:	6.4.1.1 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR COOLING
SUBSYSTEM:	RHR
COMPONENT ID:	VALVE POSITION INDICATING CONTROLLER FIC-142, "CLOSED" POSITION INDICATED ON THE RIGHT. CONVENTIONAL PATTERN IS "CLOSED" ON THE LEFT.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	FLOW CONTROLLER FIC-142 IS FOR RX HEAD SPRAY MODE OF OPERATION - WHICH IS NOT PRESENTLY IN USE. CONTROLLER WILL BE REMOVED.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* EACH CONTROL SHOULD BE OF THE TYPE NORMALLY ANTICIPATED FOR THE OPERATION CONCERNED. THIS MEANS CONFIRMING TO OPERATOR EXPECTATIONS, MATCHING TO OTHER CONTROLS FOR THE SAME FUNCTION, AND GENERALLY CONFORMING TO CONVENTIONAL PRACTICE.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	105
HED NO:	105S
DESCRIPTION:	HANDLES NEAR EDGES NOT PROTECTED WITH GUARDS TO PREVENT INADVERTENT OPERATION.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B5.4
PEF:	9
HUMAN FACTOR TOPIC:	CONTROLS/PREVENTION OF ACCIDENTAL ACTIVATION
NUREG-0700 SECTION:	6.4.1.2 *
PANEL ID:	9-3
RELATED SYSTEM (S):	CORE STANDBY COOLING SYSTEM (CSCS)
SUBSYSTEM:	CORE SPRAY(CS) & HPCI
COMPONENT ID:	MIN. FLOW BYP VALVES 5A & 5B, COND. STOR. TK SUCT VALVE 17, MSIV INBD & OUTBD VALVES 80D & 86D.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	2ND REFUELING
REFERENCES:	
HED RESOLUTION:	EQUIP WITH A RAIL.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* ACCIDENTAL ACTIVATION OF CTRLS SHOULD BE MINIMIZED BY 1) LOCATING CNTRLS SO THAT OPERATOR NOT LIKELY TO MOVE THEM ACCIDENTALLY, 2) RECESSING, SHIELDING OR SURROUNDING CNTRLS BY PHYSICAL BARRIERS.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	283
HED NO:	1655
DESCRIPTION:	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OF FUNCTION.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	55.10
PEF:	6
HUMAN FACTOR TOPIC:	CODING OF CONTROLS
NUREG-0700 SECTION:	6.4.2.2 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING SYSTEM
SUBSYSTEM:	RHR, HPCI, CS
COMPONENT ID:	1)RHR PUMP CONTROLS 3A,3B,3C,3D. 2) HPCI PMP S22. 3) CS PUMPS 1A&1B.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* CONTROLS SELECTED SHOULD BE SUITABLE FOR OPERATOR USE IN A CONTROL ROOM ENVIRONMENT. EACH CONTROL SHOULD BE RECOGNIZABLE IN TERMS OF ITS FUNCTION.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	274
HED NO:	7SS
DESCRIPTION:	PROCESS UNITS INFORMATION NOT VISIBLE THROUGH RECORDER WINDOWS.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	SB2.1,
PEF:	6
HUMAN FACTOR TOPIC:	CHARACTERISTICS OF GRAPHIC RECORDERS
NUREG-0700 SECTION:	6.5.4.1,6.5.4.2 *
PANEL ID:	9-3
RELATED SYSTEM (S):	PRIMARY CONTAINMENT
SUBSYSTEM:	PRIMARY CONTAINMENT RECORDERS
COMPONENT ID:	1) DW PRESS. RECORDER PC-PR-1A 2) PRIMARY CONTAINMENT LEVEL RECORDER PC-LR-1A
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANCEMENT
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	EXAMINE RECORDER AND DETERMINE THE CAUSE OF OBSTRUCTION. PROCESS UNITS MAY BE PLACED ON FACE OF RECORDER.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* RECORDER DESIGN SHOLD ENSURE THAT ALL DATA WILL BE VISIBLE THROUGH THE WINDOW OF THE RECORDER AND NOT REQUIRE OPEN DOOR OPERATION TO EXPOSE IT.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	134
HED NO:	1349
DESCRIPTION:	PROCEDURAL PROVISIONS TO PREVENT INTERCHANGING INDICATING LIGHT LENSES NOT AVAILABLE.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	SB3
PEF:	8
HUMAN FACTOR TOPIC:	LIGHT INDICATORS
NUREG-0700 SECTION:	6.5.3.1 *
PANEL ID:	ALL PANELS
RELATED SYSTEM (S):	ALL SYSTEMS
SUBSYSTEM:	PROCEDURES
COMPONENT ID:	INDICATION LIGHT LENSES
IMPLEMENTATION ACTION:	NO ACTION
TYPE OF CORRECTION:	OTHER MOD.
PRIORITY OF MODIFICATION:	III
SCHEDULE FOR IMPLEMENTATION:	NONE
REFERENCES:	
HED RESOLUTION:	NORMAL PRACTICE IS TO REPLACE LIGHT LENSES INDIVIDUALLY. REDUNDANT INDICATIONS AVAILABLE TO DISTINGUISH INTERCHANGING LENSES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* PRESENCE OF A LIGHT IS THE PRIMARY MEANS BY WHICH LIGHT INDICATORS COMMUNICATE A MESSAGE, IT BECOMES ESSENTIAL THAT THE LIGHT SIGNAL BE PHYSICALLY RELIABLE. PROVISIIONS SUCH AS DESIGN OR PROCED. SHOULD BE MADE TO PREVENT INTERCHANGING LENSES.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	285
HED NO:	18SS
DESCRIPTION:	ANNUNCIATORS NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEM.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C1.1
PEF:	4
HUMAN FACTOR TOPIC:	ARRANGEM'T OF VISUAL ALARM TILES
NUREG-0700 SECTION:	6.3.3.3 *
PANEL ID:	9-3
RELATED SYSTEM (S):	CORE COOLING SYSTEM
SUBSYSTEM:	HPCI ANNUNCIATORS
COMPONENT ID:	HPCI ALARMS GROUPED IN TWO ALARM BOXES 9-3-2, 9-3-3.
IMPLEMENTATION ACTION:	NO ACTION
TYPE OF CORRECTION:	OTHER MOD.
PRIORITY OF MODIFICATION:	III
SCHEDULE FOR IMPLEMENTATION:	N/A
REFERENCES:	
HED RESOLUTION:	A MINOR DISCREPANCY. THE TWO ALARM BOXES ARE ADJACENT, AND ARE LOCATED IN THE SAME PANEL
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* VISUAL ALARM TILES SHOULD BE GROUPED BY FUNCTION OR SYSTEM WITHIN EACH ANNUNCIATOR PANEL.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	286
HED NO:	1955
DESCRIPTION:	ANNUNCIATOR NOMENCLATURE, ACRONYMNS, OR ABBREVIATIONS ARE NOT STANDARDIZED.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C2.2
PEF:	6
HUMAN FACTOR TOPIC:	VISUAL TILE LEGENDS
NUREG-0700 SECTION:	6.3.3.4 *
PANEL ID:	9-3
RELATED SYSTEM (S):	ANNUNCIATORS
SUBSYSTEM:	ANNUNCIATOR TILES
COMPONENT ID:	EX, EXH, HX - DESIGNATE HEAT EXCHANGER. PP,PMP - DESIGNATE PUMP. V,VLV - DESIGNATE VALVE
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	FABRICATE NEW ANNUCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* ANNUNCIATOR VISUAL TILE LEGENDS SHOULD BE SPECIFIC & UNAMBIGUOUS. WORDING SHOULD BE IN CONCISE, SHORT MESSAGES. ABBREVIATIONS AND ACRONYMS SHOULD BE CONSISTENT WITH THOSE USED ELSEWHERE IN THE CONTROL ROOM.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	287
HED NO:	2198
DESCRIPTION:	ANNUNCIATOR LEGEND TILE TERMINOLOGY IS NOT CONSISTENT WITH THE INPUT SIGNAL FUNCTION.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C2.5
PEF:	6
HUMAN FACTOR TOPIC:	VISUAL TILE LEGENDS
NUREG-0700 SECTION:	6.3.3.4 *
PANEL ID:	9-3
RELATED SYSTEM (S):	RHR, CS
SUBSYSTEM:	ANNUNCIATORS
COMPONENT ID:	1)ANNUNCIATOR TILE "RHR PMP 1Q-3D" MISLABELED WITH RESPECT CTRL SWITCH LABEL "RHR PMP 3D". 2)"CS SYS 2" MISLABELED WITH RESPECT TO SYSTEM DESIGNATION "CS SYS B".
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	FABRICATE NEW ANNUNCIATOR LEGEND TILES AND ENSURE CONFORMANCE WITH SYSTEM DESIGNATION & CONTROLS LABELING.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* ANNUNCIATOR VISUAL TILE LEGENDS SHOULD BE SPECIFIC & UNAMBIGUOUS. WORDING SHOULD BE IN CONCISE, SHORT MESSAGES. ABBREVIATIONS AND ACRONYMS SHOULD BE CONSISTENT WITH THOSE USED ELSEWHERE IN THE CONTROL ROOM.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	288
HED NO:	2295
DESCRIPTION:	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C2.7
PEF:	6
HUMAN FACTOR TOPIC:	VISUAL TILE LEGENDS
NUREG-0700 SECTION:	6.3.3.4 *
PANEL ID:	9-3
RELATED SYSTEM (S):	HPCI, SP
SUBSYSTEM:	ANNUNCIATORS
COMPONENT ID:	1) ALARM (5-3) ON 9-3.3 "SUPPRESSION CHAMBER LEVEL HI/LO (N.R.)". 2) ALARM (6-3) ON 9-3-3 "SUPPRESSION CHAMBER LEVEL HIGH-LOW (W.R.)". 3) ALARM (7-2) ON 9-3-2 "HPCI PUMP SUCTION HIGH/LOW PRESSURE".
IMPLEMENTATION ACTION:	NO ACTION **
TYPE OF CORRECTION:	OTHER MOD.
PRIORITY OF MODIFICATION:	III
SCHEDULE FOR IMPLEMENTATION:	NONE
REFERENCES:	
HED RESOLUTION:	** FOR PANEL 9-3 WHERE THE ANNUNCIATORS ARE LOCATED, VISUAL INDICATORS ARE AVAILABLE ON THE PANEL TO VARIFY THE HIGH OR LOW INPUTS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* TILE LEGENDS SHOULD ADDRESS SPECIFIC CONDITIONS, I.E., ONE ALARM FOR HIGH/LOW AND TEMPERATURE/PRESSURE--ETC., SHOULD NOT BE USED.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	278
HED NO:	1155
DESCRIPTION:	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C2.8
PEF:	6
HUMAN FACTOR TOPIC:	ANNUNCIATORS ALARMS PRIORITIZATION
NUREG-0700 SECTION:	6.3.1.4 *
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR & CONTAINMENT COOLING SYSTEMS
SUBSYSTEM:	ANNUNCIATORS
COMPONENT ID:	ANNUNCIATOR LEGEND PLATES (SEE SEPARATE PAGE).
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR; RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* ALARM PRIORIZATION SHOULD BE ACCOMPLISHED USING A RELATIVELY SMALL NUMBER OF PRIORITY LEVELS. PRIORIZATION SHOULD BE BASED ON THE IMPORTANCE, SEVERITY OR NEED FOR OPERATOR ACTION.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	149
HED NO:	149S
DESCRIPTION:	ALARMS NOT PROVIDED WITH ALPHANUMERIC CODE FOR PROMPT RESPONSE.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C2.9
PEF:	12
HUMAN FACTOR TOPIC:	ARRANGEMENT OF VISUAL ALARM TILES
NUREG-0700 SECTION:	6.3.3.3 *
PANEL ID:	ALL PANELS
RELATED SYSTEM (S):	ALL SYSTEMS
SUBSYSTEM:	ANNUNCIATOR BOXES
COMPONENT ID:	LABELING OF AXES
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	ENGRAVE THE ALARM TILES BY NUMERIC/NUMERIC CODE. THIS WILL MAINTAIN THE EXISTING ALARM IDENTIFICATION KNOWN TO THE OPERATOR.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* VISUAL ALARMS SHOULD BE ORGANIZED AS A MATRIX OF VISUAL ALARM TILES WITHIN EACH ANNUNC. PNL. THE VERTICAL/HORIZONTAL AXES OF ANNUC PNLS SHOULD BE LABELED WITH ALPHANUMERICS FOR READY COORDINATE DESIGNATION OF A PARTICULAR VISUAL TILE.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	289
HED NO:	2355
DESCRIPTION:	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C5.5
PEF:	4
HUMAN FACTOR TOPIC:	CONTROL SET DESIGN-POSITIONING OF REPETITIVE GROUP
NUREG-0700 SECTION:	6.3.4.2 *
PANEL ID:	ALL PANELS
RELATED SYSTEM (S):	N/A
SUBSYSTEM:	ALARM RESPONSE
COMPONENT ID:	LINEAR ARRANGEMENT OF ANNUNCIATOR CONTROLS
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	2ND REFUELING
REFERENCES:	
HED RESOLUTION:	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB's ON TOP ROW, AND "TEST" ON BOTTOM RAW. SEE CNS HF STANDARDS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* REPETITIVE GROUPS OF ANNUNCIATOR CONTROLS SHOULD HAVE THE SAME ARRANGEMENT AND RELATIVE LOCATION AT DIFFERENT WORKSTATIONS. THIS IS TO FACILITATE "BLIND" REACHING.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	155
HED NO:	155S
DESCRIPTION:	ALARMS DO NOT REFLASH FOR SECOND ALARM INPUT.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C6.3
PEF:	12
HUMAN FACTOR TOPIC:	ANNUNCIATOR WARNING SYS/DESIGN
NUREG-0700 SECTION:	6.3.1.2 *
PANEL ID:	ALL PANELS
RELATED SYSTEM (S):	SYSTEMS WITH MULTIPLE-INPUT ALARMS
SUBSYSTEM:	ANNUNCIATORS
COMPONENT ID:	ALARM REFLASHING CAPABILITY
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	2ND REFUELING
REFERENCES:	
HED RESOLUTION:	THE EXISTING ANNUNCIATOR SYSTEMS WILL BE MODEIFIED TO PROVIDE AUDITORY ALERT AND REFLASH CAPABILITIES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* WHEN MULTI-INPUT ANNUNCIATORS MUST BE USED, REFLASH CAPABILITY SHOULD BE PROVIDED TO ALLOW SUBSEQUENT ALARMS TO AVTIVATE THE AUDITORY ALERT SYSTEM & REFLASH THE VISUAL TILE EVEN THOUGH THE FIRST ALARM MAY NOT HAVE BEEN CLEARED.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HED*

Record No.	156
HED NO:	156S
DESCRIPTION:	NO STANDARD GUIDE FOR WRITING ANNUNCIATOR PROCEDURES IS IN USE.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C7.1
PEF:	12
HUMAN FACTOR TOPIC:	ANNUCIATOR RESPONSE PROCEDURES
NUREG-0700 SECTION:	6.3.4.3 *
PANEL ID:	ALL PANELS
RELATED SYSTEM (S):	ALL SYSTEMS
SUBSYSTEM:	PROCEDURES
COMPONENT ID:	ANNUNCIATOR PROCEDURE
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	PROVIDE A STANDARD FOR WRITING ANNUNCIATOR PROCEDURES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* NUREG-0700 DOES NOT DIRECTLY ADDRESS THE WRITING OF ANNUNCIATOR RESPONSE PROCEDURES OTHER THAN TO SAY A RESPONSE PROCEDURE SHOULD BE PROVIDED TO THE OPERATOR. THEY SHOULD BE EASILY INDEXED BY PANEL TO EXPEDITE APPROPRIATE RESPONSE TO THE ALARM.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HED*

Record No.	158
HED NO:	158S
DESCRIPTION:	HIGHLY DENSE ANNUNCIATOR MATRICES.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	SC1
PEF:	9
HUMAN FACTOR TOPIC:	ARRANGEMENT OF VISUAL ALARM TILES
NUREG-0700 SECTION:	6.3.3.3 *
PANEL ID:	ALL PANELS
RELATED SYSTEM (S):	ALL SYSTEMS
SUBSYSTEM:	ANNUNCIATORS
COMPONENT ID:	ALARM TILES
IMPLEMENTATION ACTION:	NO ACTION
TYPE OF CORRECTION:	OTHER MOD.
PRIORITY OF MODIFICATION:	III
SCHEDULE FOR IMPLEMENTATION:	NONE
REFERENCES:	
HED RESOLUTION:	NOT A SERIOUS PROBLEM. THE MAXIMUM NUMBER OF TILES (PNL 9-5) IS 54, CLOSE TO 50 RECOMMENDED IN NUREG 0700.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* THE NUMBER OF ALARM TILES AND THE MATRIX DENSITY SHOULD BE KEPT LOW (A MAXIMUM OF 50 TILES PER MATRIX IS SUGGESTED).

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	179
HED NO:	3T
DESCRIPTION:	FRONT PANELS PRIMARY CONTAINMENT PRESS. RECORDERS NEED TO IDENTIFY NORMAL/OFF NORMAL RANGE OF OPERATION.
HED SOURCE:	TASK ANALYSIS
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	ZONE MARKING
NUREG-0700 SECTION:	6.5.2.3
PANEL ID:	9-3 & 9-4
RELATED SYSTEM (S):	PRIM. CONT.
SUBSYSTEM:	PRIM. CONT. PRESS. INSTR.
COMPONENT ID:	PRESS. REC. PC-PR-1A & PC-PR-1B
IMPLEMENTATION ACTION:	FIX*
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	*COMBINE WITH HED 57S FOR PC-PR-1A, AND HED 26SS FOR PC-PR-1B.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	195
HED NO:	19T
DESCRIPTION:	WIDE RANGE TORUS PRESSURE INDICATION NOT AVAILABLE.
HED SOURCE:	TASK ANALYSIS+
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	DISPLAYED INFORMATION -USE OF TASK ANALYSIS
NUREG-0700 SECTION:	6.3.1.1
PANEL ID:	9-3 & 9-4
RELATED SYSTEM (S):	PRIMARY CONTAINMENT
SUBSYSTEM:	PRIM. CONT. PRESSURE INSTR.
COMPONENT ID:	PRESS.IND.
IMPLEMENTATION ACTION:	FIX*
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	I
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	+EMERG.OPER.PROC.SECTION EOP-2
HED RESOLUTION:	*INTEGRATE WITH RG 1.97 PC PRESSURE INSTRUMENTATION. RECORDER DESIGN REQUIREMENTS: RANGE -5 TO 80 PSIG, ACC. 2% OPERABILITY REQUIREMENTS: RG 1.97 INSTR., CATEGORY 1. DESIGN IS TO MEET CNS HF ENGINEERING STANDARDS TO VISUAL DISPLAYS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	196
HED NO:	20T
DESCRIPTION:	SRV LABEL IDENTIFICATION OUT OF SEQUENCE.
HED SOURCE:	TASK ANALYSIS+
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	LOGICAL ARRANGMENET & LAYOUT
NUREG-0700 SECTION:	6.8.2.2,
PANEL ID:	9-3
RELATED SYSTEM (S):	RPV
SUBSYSTEM:	SAFETY RELIEF VALVES
COMPONENT ID:	VALVE SWITCHES 71A,B,C,E,G,H,D,F,
IMPLEMENTATION ACTION:	FIX*
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	+EMERG.OPER.PROC.SECTION EOP-1
HED RESOLUTION:	*SAME HED IDENTIFIED BY CONTROL ROOM SURVEY (HED 355)
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	197
HED NO:	21T
DESCRIPTION:	FUNCTIONAL SEPARATION BETWEEN ADS & LLS VALVES NOT EVIDENT
HED SOURCE:	TASK ANALYSIS
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	NEED FOR LOCATION AIDS
NUREG-0700 SECTION:	6.6.6.2 (SEE COMMENTS)
PANEL ID:	9-3
RELATED SYSTEM (S):	RPV
SUBSYSTEM:	ADS, LLS VALVES
COMPONENT ID:	DEMARCATION BETWEEN ADS AND LLS VALVES
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	SEPARATE BETWEEN ADS AND LLS VALVES THROUGH USE OF LINES OF DEMARCATION.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	LINES OF DEMARCATION CAN BE USED TO ENCLOSE 1) FUNCT RELATED DISPLAYS, 2) FUNCT RELATED CNTRLS, AND 3) GROUP RELATED CNTRLS & DISPLAYS. LINES OF DEMARCATION SHOULD BE VISUALLY DISTINCTIVE FROM THE PANEL BKGROUND AND BE PERMANENTLY ATTACHED.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	209
HED NO:	33T
DESCRIPTION:	POSITION LOCK SWITCHES FOR CS, RHR, AND RCIC TO PREVENT AUTOMATIC INITIATION NOT AVAILABLE.
HED SOURCE:	TASK ANALYSIS*
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	INTERLOCKING CONTROLS
NUREG-0700 SECTION:	6.4.1.2
PANEL ID:	9-3 & 9-4
RELATED SYSTEM (S):	CORE COOLING SYSTEMS
SUBSYSTEM:	CS, RHR'S (PANEL 9-3), RCIC (PANEL 9-4)
COMPONENT ID:	PUMP LOCKOUT DEVICES
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.& PROC. REVIEW
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	2ND REFUELING
REFERENCES:	*EMERG.OPER.PROC.SECTION EOP-1
HED RESOLUTION:	INSTALL LOCKING SYSTEM AND ASSOCIATED ALARMS TO INFORM OPERATOR OF CS, RHR'S, AND RCIC AUTOMATIC INITIATION INHIBIT.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	210
HED NO:	34T
DESCRIPTION:	POINTER OF FUEL ZONE INDICATION TOO WIDE - COVERS SCALE.
HED SOURCE:	TASK ANALYSIS
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	VISUAL DISPLAYS - POINTERS
NUREG-0700 SECTION:	6.5.2.2, (SEE COMMENTS)
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR COOLING
SUBSYSTEM:	RPV LEVEL INSTR.
COMPONENT ID:	METER IND.
IMPLEMENTATION ACTION:	NO ACTION
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	NONE
REFERENCES:	
HED RESOLUTION:	METER HAS BEEN REPLACED.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	POINTER TIPS SHOULD BE SIMPLE. THEY SHOULD BE SELECTED TO MINIMIZE CONCEALMENT OF THE SCALE GRADUATION MARKS OR NUMERALS.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	211
HED NO:	35T
DESCRIPTION:	RHR SERVICE WATER PUMP CONTROLS AND INDICATIONS ARE LOCATED ON BACK PANELS RATHER THAN PANEL 9-3.
HED SOURCE:	TASK ANALYSIS*
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	CONTROL - DISPLAY GROUPING
NUREG-0700 SECTION:	6.3.1.1, 6.9.1, (SEE COMMENTS)
PANEL ID:	9-3
RELATED SYSTEM (S):	RHR
SUBSYSTEM:	RHR SERVICE WATER
COMPONENT ID:	SERVICE WATER PUMP CONTROL AND AMP METERS ON VBD-M, LOOP FLOW CONTROLS ON PNL 9-3.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	*EMERG.OPER.PROC.SECTION EOP-1
HED RESOLUTION:	INSTALL PUMP CONTROLS ON PANEL 9-3.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	CONTROLS AND DISPLAYS WHICH ARE NORMALLY USED TOGETHER SHOULD BE LOCATED IN CLOSE PROXIMITY TO EACH OTHER.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	215
HED NO:	39T
DESCRIPTION:	SP LEVEL ALARM UTILIZES COMMON ANNUNCIATOR FOR BOTH HIGH & LOW LEVELS.
HED SOURCE:	TASK ANALYSIS
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	VISUAL TILE LEGENDS
NUREG-0700 SECTION:	6.3.3.4
PANEL ID:	9-3
RELATED SYSTEM (S):	SUPP. POOL
SUBSYSTEM:	SUPP. POOL LEVEL
COMPONENT ID:	ALARM
IMPLEMENTATION ACTION:	NO ACTION
TYPE OF CORRECTION:	OTHER MOD.
PRIORITY OF MODIFICATION:	III
SCHEDULE FOR IMPLEMENTATION:	NONE
REFERENCES:	
HED RESOLUTION:	SAME DISCREPANCY IDENTIFIED IN CR SURVEY (HED 22SS). NO ACTION IS NECESSARY. INDICATIONS TO VERIFY ALARMS ARE LOCATED ON SAME PANEL.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	216
HED NO:	40T
DESCRIPTION:	INCORRECT DEMARCATION OF ALARM SETPOINTS ON SP LEVEL INDICATION.
HED SOURCE:	TASK ANALYSIS
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	ZONE MARKING
NUREG-0700 SECTION:	6.5.2.3, SEE COMMENTS
PANEL ID:	9-3
RELATED SYSTEM (S):	PRIMARY CONTAINMENT
SUBSYSTEM:	SUPP. POOL
COMPONENT ID:	LEVEL IND.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	REMOVE EXISTING ALARM MARKS (TAPE) AND REMARK THE METER IN AGREEMENT WITH SPECIFIC STATION STANDARDS AND NUREG 0700 GUIDELINES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	ZONE MARKINGS SHOULD BE USED TO SHOW OPERATIONAL IMPLICATIONS OF VARIOUS READINGS "OPERATING RANGE, UPPER/LOWER LIMITS, OR DANGER ZONE. ZONE MARKINGS SHOULD BE CONSPICUOUS AND DISTINCTIVELY DIFFERENT FOR DIFFERENT ZONES.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	222
HED NO:	46T
DESCRIPTION:	LABEL DIFFERENTIATION BETWEEN SP AND DW SYSTEM SPRAYS NEEDED.
HED SOURCE:	TASK ANALYSIS
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	LABELING INFORMATION
NUREG-0700 SECTION:	6.6.3.1,
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR COOLING
SUBSYSTEM:	RHR SP & DW SPRAY
COMPONENT ID:	LABELS FOR VALVES 31A & 38A AND 31B & 38B
IMPLEMENTATION ACTION:	FIX*
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	* SAME HED IDENTIFIED IN CR SURVEY (HED 8SS).
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	231
HED NO:	55T
DESCRIPTION:	ACTION LEVELS ON SP TEMPERATURE AND LEVEL AND, RX LEVEL AND PRESSURE NEED TO BE MARKED.
HED SOURCE:	TASK ANALYSIS
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	ZONE MARKING
NUREG-0700 SECTION:	6.5.2.3.
PANEL ID:	9-3 & 9-4
RELATED SYSTEM (S):	CONTAINMENT COOLING
SUBSYSTEM:	PRIMARY CONTAINMENT (DW, SP)
COMPONENT ID:	PC-PR-1A&2A, PC-LI-13, CP-PI-512, PC-LI-12,
IMPLEMENTATION ACTION:	FIX*
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	* DUPLICATE. IDENTICAL TO HED 57S, FROM CRS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	264
HED NO:	11I
DESCRIPTION:	RHR 2/3 CORE HEIGHT LEVEL PERMISSIVE MANUAL OVERRIDE SWITCH LABEL CONFUSING.
HED SOURCE:	OPER. INTERVIEW
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	LABELING INFORMATION
NUREG-0700 SECTION:	6.6.3.1, (SEE COMMENTS)
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR COOLING
SUBSYSTEM:	RHR's
COMPONENT ID:	RHR (2/3) LOGIC OVERIDE SWITCHES S18A LABELS
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	NEW LABEL SHOULD BE FABRICATED IN AGREEMENT WITH CNS STATION STANDARDS AND NUREG 0700 GUIDELINES. ENSURE APPROPRIATE PROCEDURES ARE UPDATED REFLECTING CHANGE IN TERMINOLOGY WHERE APPLICABLE.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	LABELS SHOULD DESCRIBE THE FUNCTION OF EQUIPMENT ITEMS. THE WORDS EMPLOYED IN THE LABEL SHOULD EXPRESS EXACTLY WHAT ACTION IS INTENDED.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	266
HED NO:	131
DESCRIPTION:	NO DIRECT REACTOR WATER LEVEL INSTRUMENTATION ON PANEL 9-3
HED SOURCE:	OPER. INTERVIEW
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	DISPLAYED INFORMATION
NUREG-0700 SECTION:	N/A
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR COOLING
SUBSYSTEM:	REACTOR WATER LEVEL INSTRUMENTATION
COMPONENT ID:	DIRECT WL INSTRUMENTATION COVERING RANGE FROM NORMAL WL TO BOTTOM OF CORE
IMPLEMENTATION ACTION:	INSTALL
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	III
SCHEDULE FOR IMPLEMENTATION:	2ND REFUELING
REFERENCES:	
HED RESOLUTION:	INTEGRATE WITH HED 18T&131 FOR INSTALLING WIDE RANGE/FUEL ZONE WL RECORDER THAT COVERS THE RANGE FROM NORMAL WL TO BOTTOM OF CORE. RECORDER READING SHOULD YIELD DIRECT WL IN THE RPV, REFERENCED TO TOP OF ACTIVE FUEL.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	268
HED NO:	151
DESCRIPTION:	LACK OF DIRECT ACCIDENT WATER LEVEL INDICATION.
HED SOURCE:	OPER. INTERVIEW
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	DISPLAYED INFORMATION
NUREG-0700 SECTION:	N/A
PANEL ID:	9-3
RELATED SYSTEM (S):	REACTOR COOLING
SUBSYSTEM:	REACTOR WL INSTRUMENTATION
COMPONENT ID:	WL INDICATION THAT DISPLAYS THE LEVEL IN THE RPV UNDER ACCIDENT CONDITIONS (HIGH DW TEMPERATURE AND RX DEPRESSURIZATION)
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	2ND REFUELING
REFERENCES:	
HED RESOLUTION:	INTEGRATE WITH HED 18T&13I AND RG 1.97 WL INSTRUMENTATION. NPPD WILLIMPLEMENT A PROGRAM OF COOLING THE WL REFERENCE LEG OR RELOCATING IT OUTSIDE THE DW. THIS WILL RESULT IN DISPLAYING A DIRECT WL IN THE CNTRL RM UNDER ACCIDENT CONDITIONS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

APPENDIX B (CONT'D)

HUMAN ENGINEERING DISCREPANCY (HED) SHEETS

B.2 VBD-S (BACK PANEL) HED SHEETS

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	461
HED NO:	1748S
DESCRIPTION:	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A2.3
PEF:	6
HUMAN FACTOR TOPIC:	NEED FOR LOCATION AIDS
NUREG-0700 SECTION:	6.6.6.1, 6.6.6.2, 6.8.1.3*
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	T/G BLDG,RX BLDG,CONTROL BLDG&ERP SUMP PUMPS
COMPONENT ID:	SUMP PUMPS CONTROLS & SUMP LEVEL INDICATION
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	PHOTO VBD-S
HED RESOLUTION:	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	*OPERATOR PERFORMANCE CAN BE ENHANCED THRU USE OF LOCATION AIDS SUCH AS DEMARCATION,COLOR, AND MIMICS. LINES OF DEMARCATION CAN BE USED TO ENCLOSE FUNCTIONALLY RELATED DISPLAYS. SHOULD BE VISUALLY DISTINCT FROM PANEL BACKGROUND & PERMANE

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	459
HED NO:	1735S
DESCRIPTION:	CONTROLS & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A3.6 & B5.3,
PEF:	6
HUMAN FACTOR TOPIC:	CTRL RM WORKSPACE/ANTHROPOMETRIC BASIS
NUREG-0700 SECTION:	6.1.2
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	T/G AND E.R.P SUMP PUMPS, TORUS AREA
CCMPONENT ID:	1) TOP ROW OF T\G BLDG SUMP PUMP SWITCHES LOCAEED 12" ABOVE LIMITS, 2) E.R.P. PUMP COUNTERS LOCATED 18" BELOW LIMITS, 3) TORUS AREA LEVEL INDICATION LOCATED BELOW LIMITS
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	PHOTO VBD-S
HED RESOLUTION:	RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS. FOR THOSE METERS THAT WILL NOT BE RELOCATED, UTILIZE TILTING OF DISPLAYS TO IMPROVE READABILITY.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	449
HED NO:	183SS
DESCRIPTION:	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A3.7,SA3,
PEF:	9
HUMAN FACTOR TOPIC:	CONTROL - DISPLAY INTEGRATION
NUREG-0700 SECTION:	6.4.2.2,6.5.1.6,6.6.6.4*
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	ELEVATED RELEASE POINT SUMP PUMP
COMPONENT ID:	DEMARCATION OF SUMP PUMP INDICATIONS: "HOUR-RUN METERS" & "START COUNTERS" WITH ASSOCIATED SUMP PUMP CONTROLS.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	INTEGRATE WITH HED 173SS FOR POSSIBILITY OF RELOCATING CONTROLS & INDICATIONS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	* CONTROLS SHOULD BE LOCATED SO AS TO BE EASILY RELATED TO FUNCT. & FUNCTIONAL GROUPINGS. CNTRLS OF SIMILAR FUNCT. SHOULD BE IN THE SAME LOCATION FROM PANEL TO PANEL. OTHER METHODS OF ASSOCIATION BETWEEN CONTROLS & DISPLAYS ARE COLOR & LABEL CODING.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	442
HED NO:	176SS
DESCRIPTION:	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A5.5
PEF:	4
HUMAN FACTOR TOPIC:	LABELS WORD SELECTION, CONSISTENT, SYMBOLS
NUREG-0700 SECTION:	6.6.3.2, 6.6.3.3, 6.6.3.4 *
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	RX BLDG DRAIN VALVES & PUMPS
COMPONENT ID:	1) LABELS FOR VALVE CONTROLS USE "VA" INSTEAD OF "VLV". 2)PUMP LABELS USE 1A,1B,1C...INSTEAD OF A,B,C
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	THE WORDS EMPLOYED IN THE LABEL SHOULD EXPRESS EXACTLY WHAT ACTION IS INTENDED. A LIST OF STANDARD NAMES, ACRONYMS, ABBREVIATIONS, AND PART/SYSTEM NUMBERS SHOULD BE IN PLACE AND ADMINISTRATIVELY CONTROLLED.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	441
HED NO:	175SS
DESCRIPTION:	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A5.10
PEF:	6
HUMAN FACTOR TOPIC:	LABELING INFORMATION
NUREG-0700 SECTION:	6.6.2.1,6.6.3.1,SEE COMMENTS
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	RX BLDG SUMPS
COMPONENT ID:	SUMP 1E SELECTOR SWITCH HAS TWO LIT RED LIGHTS ABOVE CONTROLS.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	REVIEW LABEL CONTENT AND FABRICATE NEW LABELING THAT DESCRIBES FUNCTION OF THE TWO RED LIGHTS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	LABELS SHOULD DESCRIBE FUNCT.OF EQUIP.ITEMS. WORDS EMPLOYED IN LABEL SHOULD EXPRESS EXACTLY WHAT ACTION IS INTENDED. LABELS SHOULD BE CONSISTENT WITHIN AND ACROSS PIECES OF EQUIPMENT IN THEIR USE OF WORDS, ACRONYMS, ABBREVIATIONS,& PART/SYS NO.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	462
HED NO:	184SS
DESCRIPTION:	EXTENSIVE TEMPORARY LABELS ARE BEING USED.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	A6.1, A6.3
PEF:	6
HUMAN FACTOR TOPIC:	USE AND CONTROL OF TEMPORARY LABELS
NUREG-0700 SECTION:	6.6.5.1, SEE COMMENTS
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	SUMP PUMP LABELING
COMPONENT ID:	1) SUMP PUMPS POWER SUPPLY LABELS, 2) RX BLDG QUAD LABELS
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	WHEN NECESSARY TO IDENTIFY OUT OF SERVICE EQUIPMENT, OR TO IMPROVE OPERATOR UNDERSTANDING AND EFFICIENCY, TEMPORARY LABELS MAY BE USED UNTIL PERMANENT LABELS ARE AVAILABLE OR UNTIL THE TEMPORARY LABEL IS NO LONGER NECESSARY.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	443
HED NO:	177SS
DESCRIPTION:	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B2.1
PEF:	9
HUMAN FACTOR TOPIC:	ZONE MARKING
NUREG-0700 SECTION:	6.5.2.3 (SEE MISC/COMMENTS)
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	TORUS AREA
COMPONENT ID:	TORUS AREA LEVEL INDICATOR LI-900
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	ZONE MARKINGS SHOULD BE USED TO SHOW OPERATIONAL IMPLICATIONS OF VARIOUS READINGS SUCH AS "OPERATIONAL RANGE", "UPPER LIMITS", "LOWER LIMITS", AND "DANGER ZONE". ZONE MARKINGS SHOULD BE CONSPICUOUS AND DISTINCTIVELY DIFFERENT FOR DIFFERENT ZONES.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	444
HED NO:	17899
DESCRIPTION:	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B2.12
PEF:	6
HUMAN FACTOR TOPIC:	SCALE MARKING
NUREG-0700 SECTION:	6.5.2.5 (SEE MISC/COMMENTS)
PANEL ID:	VBD-8
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	TORUS AREA
COMPONENT ID:	TORUS AREA LEVEL INDICATION LI-900 HAS 24 MARKINGS BETWEEN NUMERALS
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	B
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	REPLACE SCALES PER CNS STANDARDS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	SCALES FOR QUANTITATIVE READING SHOULD BE PROVIDED WITH GRADUATIONS CONSISTENT WITH THE PROGRESSION OF THEIR NUMERALS. NO MORE THAN 9 GRADUATIONS SHOULD SEPARATE NUMERALS.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	463
HED NO:	1855S
DESCRIPTION:	CONTROL SWITCH POSITION NOT PERMANENTLY MARKED.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B5.2
PEF:	6
HUMAN FACTOR TOPIC:	CONTROL POSITION LABELING
NUREG-0700 SECTION:	6.6.3.8
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	RX BLDG SUMP PUMPS
COMPONENT ID:	"AUTO" POSITION FOR "RX BLDG EQUIP DR. SUMP PUMP 1E SEL SW" MARKED W/LABEL TAPE.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	PURCHASE OR FABRICATE NEW LEGEND LABELS WHICH REFLECT CONTROL POSITION. THE NEW LABELS SHOULD BE CONSISTENT WITH EXISTING LABELS IN TERMS OF COLOR, LETTER SIZE, TERMINOLOGY, SIZE AND LOCATION. ALL LABELS SHOULD BE PERMANENTLY ATTACHED.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	110
HED NO:	110S
DESCRIPTION:	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OF FUNCTION.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	B5.10
PEF:	6
HUMAN FACTOR TOPIC:	CODING OF CONTROLS
NUREG-0700 SECTION:	6.4.2.2 (SEE COMMENTS)
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	SUMP VALVES AND PUMPS
COMPONENT ID:	SUMP VALVE & PUMP SWITCHES
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	CONTROLS SELECTED SHOULD BE SUITABLE FOR OPERATOR USE IN A CONTROL ROOM ENVIRONMENT. EACH CONTROL SHOULD BE RECOGNIZABLE IN TERMS OF ITS FUNCTION.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	138
HED NO:	138S
DESCRIPTION:	ANNUNCIATORS NOT GROUPED ABOVE RELATED CONTROLS AND DISPLAYS.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C1.1 & C1.2
PEF:	8
HUMAN FACTOR TOPIC:	LOCATION OF ANNUNCIATORS
NUREG-0700 SECTION:	6.3.3.1, SEE COMMENTS
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	DRYWELL SUMP
COMPONENT ID:	1) ANNUNCIATOR 5-2 AND 5-4 , "DW SUMP FILL-UP RATE HIGH" ON VBD-S, PUMP FLOW INDICATION ON PANEL 9-4. 2) ANNUNCIATOR 6-2 "TROUBLE ARW-HVAC" ON VBD-S, ASSOCIATED CONTROLS LOCATED ON VBD-R.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	CORRECT THIS HED BY BRINGING THESE ANNUNCIATOR ALARMS CLOSER TO THE CONTROLS AND DISPLAYS ON ASSOCIATED PANELS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	ANNUNCIATOR PANELS ARE GENERALLY ORGANIZED AS MATRICES OF VISUAL ALARM TITLES. THESE MATRICES SHOULD BE SEPARATED INTO GROUPS BY FUNCTION. THE ALARM PANELS SHOULD BE LOCATED ABOVE THE RELATED CONTROLS AND DISPLAYS.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	446
HED NO:	180SS
DESCRIPTION:	ANNUNCIATOR NOMENCLATURE, ACRONYMNS, OR ABBREVIATIONS ARE NOT STANDARDIZED.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C2.1
PEF:	4
HUMAN FACTOR TOPIC:	VISUAL TILE LEGENDS
NUREG-0700 SECTION:	6.3.3.4 (SEE COMMENTS)
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	ANNUNCIATORS
COMPONENT ID:	SUMP "1-V" ON ALARM TILE VS. SUMP "1V" ON SWITCH LABEL
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	ANNUNCIATOR VISUAL TILE LEGENDS SHOULD BE SPECIFIC & UNAMBIGUOUS. WORDING SHOULD BE IN CONCISE, SHORT MESSAGES. ABBREVIATIONS AND ACRONYMS SHOULD BE CONSISTENT WITH THOSE USED ELSEWHERE IN THE CONTROL ROOM.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	447
HED NO:	1815S
DESCRIPTION:	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C2.8
PEF:	6
HUMAN FACTOR TOPIC:	ANNUNCIATORS ALARMS PRIORITIZATION
NUREG-0700 SECTION:	6.3.1.4 (SEE MISC/COMMENTS)
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	ANNUNCIATORS
COMPONENT ID:	ANNUNCIATOR LEGEND PLATES FOR SUMP PUMP LEVELS AND TORUS AREA
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR; RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	ALARM PRIORITIZATION SHOULD BE ACCOMPLISHED USING A RELATIVELY SMALL NUMBER OF PRIORITY LEVELS. PRIORITIES SHOULD BE BASED ON THE IMPORTANCE, SEVERITY OR NEED FOR OPERATOR ACTION.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	448
HED NO:	182SS
DESCRIPTION:	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	C5.5
PEF:	4
HUMAN FACTOR TOPIC:	CONTROL SET DESIGN-POSITIONING OF REPETITIVE GROUP
NUREG-0700 SECTION:	6.3.4.2 (SEE MISC/COMMENTS)
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	ALARM RESPONSE SYSTEM
COMPONENT ID:	ANNUNCIATOR RESPONSE CONTROLS: TWO PB's ON THIS PANEL VS. THREE PB's ON OTHER PANELS. NO RESET BUTTON.
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	II
SCHEDULE FOR IMPLEMENTATION:	2ND REFUELING
REFERENCES:	PHOTO, VBD-S
HED RESOLUTION:	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB's ON TOP ROW, AND TEST ON BOTTOM ROW. SEE CNS HF STANDARDS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	REPETITIVE GROUPS OF ANNUNCIATOR CONTROLS SHOULD HAVE THE SAME ARRANGEMENT AND RELATIVE LOCATION AT DIFFERENT WORKSTATIONS. THIS IS TO FACILITATE "BLIND" REACHING.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	164
HED NO:	164S
DESCRIPTION:	ANNUNCIATOR RESPONSE CONTROLS NOT CODED FOR EASE OF RECOGNITION.
HED SOURCE:	CR SURVEY
CRS CHECKLIST:	SC2
PEF:	B
HUMAN FACTOR TOPIC:	ANNUNCIATOR RESPONSE SYSTEM DESIGN
NUREG-0700 SECTION:	6.3.4.2, SEE COMMENTS
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	ANNUNCIATOR RESPONSE SYSTEM
COMPONENT ID:	ANNUNCIATOR RESPONSE CONTROLS DEMARCATION
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	ENHANC.
PRIORITY OF MODIFICATION:	A
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	
HED RESOLUTION:	INTEGRATE WITH HED 1825S. ENCLOSE THE CONTROLS WITH DEMARCATION LINES IN ACCORDANCE WITH CNS HF STANDARDS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	ANNUNCIATOR RESPONSE CONTROLS SHOULD BE CODED FOR EASY RECOGNITION USING TECHNIQUES SUCH AS COLOR CODING, COLOR SHADING THE GROUP OF ANNUNCIATOR CONTROLS, OR DEMARCATING THE GROUP OF ANNUNCIATOR CONTROLS.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	239
HED NO:	637
DESCRIPTION:	SECONDARY CONTAINMENT (SC) SUMPS' WATER LEVEL INDICATIONS NOT AVAILABLE.
HED SOURCE:	TASK ANALYSIS*
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	DISPLAYED INFORMATION - USE OF TASK ANALYSIS
NUREG-0700 SECTION:	6.5.1.1, SEE COMMENTS
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	SC SUMP
COMPONENT ID:	SC SUMP AND AREA LEVEL INDICATIONS
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	I
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	*EMERG.OPER.PROC.SECTION EOP-3
HED RESOLUTION:	PROVIDE SUMPS' WL INDICATIONS. RANGE TO COVER EOP REQUIREMENTS + 20%. OPERABILITY REQUIREMENTS OF INSTRUMENTS ARE SAME AS CATEGORY 2 OF RG 1.97 INSTRUMENTATION.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	ANALYSES OF OPERATOR TASKS IS RECOMMENDED FOR ESTABLISHING OPERATOR INFORMATION REQUIREMENTS. VISUAL DISPLAYS SHOULD PROVIDE ALL THE INFORMATION ABOUT SYSTEM STATUS & PARAMETER VALUES NEEDED TO MEET TASK REQUIREMENTS IN NORMAL AND EMERG. SITUATIONS.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	240
HED NO:	64T
DESCRIPTION:	ALARM FOR SECONDARY CONTAINMENT TORUS AREA LEVEL, AS AN ALERT TO EMERGENCY, NOT AVAILABLE.
HED SOURCE:	TASK ANALYSIS
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	DISPLAYED INFORMATION. USE OF TASK ANALYSIS.
NUREG-0700 SECTION:	6.5.1.1, SEE COMMENTS
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	TORUS AREA
COMPONENT ID:	TORUS AREA LEVEL ALARM
IMPLEMENTATION ACTION:	FIX
TYPE OF CORRECTION:	DESIGN MOD.
PRIORITY OF MODIFICATION:	I
SCHEDULE FOR IMPLEMENTATION:	1ST REFUELING
REFERENCES:	EMERG.OPER PROC.SECTION EOP-3
HED RESOLUTION:	PROVIDE TORUS AREA LEVEL ALARM, WITH A SETPOINT CONSISTENT WITH EOP ENTRY CONDITIONS.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	ANALYSIS OF OPERATOR TASKS IS RECOMMENDED FOR ESTABLISHING OPERATOR INFORMATION REQUIREMENTS.

COOPER NUCLEAR STATION
DETAILED CONTROL ROOM DESIGN REVIEW HEDs

Record No.	241
HED NO:	65T
DESCRIPTION:	DIRECT INDICATION OF SECONDARY CONTAINMENT SUMP PUMPS' DISCHARGE NOT AVAILABLE.
HED SOURCE:	TASK ANALYSIS
CRS CHECKLIST:	N/A
PEF:	N/A
HUMAN FACTOR TOPIC:	DISPLAYED INFORMATION. USE OF TASK ANALYSIS
NUREG-0700 SECTION:	6.5.1.1
PANEL ID:	VBD-S
RELATED SYSTEM (S):	PLANT SUMP PUMPS
SUBSYSTEM:	SC SUMP PUMPS
COMPONENT ID:	PRESS. OR FLOW IND.
IMPLEMENTATION ACTION:	NO ACTION
TYPE OF CORRECTION:	OTHER MOD.
PRIORITY OF MODIFICATION:	III
SCHEDULE FOR IMPLEMENTATION:	NONE
REFERENCES:	
HED RESOLUTION:	HED 63T SUMP LEVEL INSTALLATION WILL PROVIDE NECESSARY INDICATION OF SYSTEM FUNCTIONAL OPERATION. NO ADDITIONAL ACTION REQUIRED.
VERIFICATION	
NEW HED? Y/N:	
IMPLEMENTATION DATE:	
VALIDATION:	
MISC/COMMENTS:	

APPENDIX C

SUMMARY OF SUPPLEMENTAL HEDs

(Previously Identified As HEOs in Summary Report)

APPENDIX C
LIST OF SUPPLEMENTAL HEDS
(Previously Identified As HEDs In Summary Report

HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
1SS	9-3	LACK OF MIMICS INTEGRATING SYSTEM COMPONENTS.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
2SS	9-3	LACK OF LABELS FOR IDENTIFYING COMPONENT FUNCTION AND POWER SUPPLY TO INSTRUMENTS.	FIX	IDENTIFY POWER SUPPLY SOURCE ON METERS AND RECORDERS. CORRECT LABELS IDENTIFICATION.
3SS	9-3	ADS RELIEF VALVE CONTROLS OUT OF CONSISTENT SEQUENCING.	FIX	OPENING SEQUENCE OF ADS VALVES IS MORE SIGNIFICANT THAN VALVE ARRANGEMENT. LABELS FOR VALVE OPENING SEQUENCE WILL BE PLACED ON TOPS OF SWITCHES' COVERS.
6SS	9-3	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STANDARDS, THAT INCLUDE LABELING AND LIST OF STANDARD ABBREVIATIONS.
7SS	9-3	PROCESS UNITS INFORMATION NOT VISIBLE THROUGH RECORDER WINDOWS.	FIX	EXAMINE RECORDER AND DETERMINE THE CAUSE OF OBSTRUCTION. PROCESS UNITS MAY BE PLACED ON FACE OF RECORDER.
8SS	9-3	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	FIX	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
9SS	9-3	INDICATING CONTROLLER DOES NOT FOLLOW CONVENTIONAL PATTERN.	FIX	FLOW CONTROLLER FIC-142 IS FOR RX HEAD SPRAY MODE OF OPERATION - WHICH IS NOT PRESENTLY IN USE. CONTROLLER WILL BE REMOVED.

APPENDIX C
LIST OF SUPPLEMENTAL HEDS
(Previously Identified As HEDs In Summary Report

HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
10SS	9-3	INDICATOR DESIGN DOES NOT FOLLOW CONVENTIONAL PATTERN.	FIX	REPLACE METER
11SS	9-3	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	FIX	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
12SS	9-3	INCONSISTENT SEQUENCING OF ANNUNCIATOR BOXES	NO ACTON	NO SAFETY RISK. ALARM PROCEDEDURES ARE SEPARATE FOR EACH BOX, AND ARE ATTACHED TO EACH SUBSECTION OF THE PANEL. ANNUNCIATOR BOX WILL BE MADE MORE VISIBLE THROUGH DISTINCTIVE LABELING.
13SS	9-3	INSTRUMENTS ARE NOT SCALED IN PROCESS UNITS RELATING TO SYSTEM OPERATION.	FIX	SCALE CHANGES SHOULD BE PERFORMED BY MINOR DESIGN CHANGE. ENSURE APPROPRIATE CALIBRATION & SURVEILLANCE PROCEDURES ARE UPDATED. ENSURE APPROPRIATE OPERATOR TRAINING WILL BE CONDUCTED.
14SS	9-3	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.
15SS	9-3	INDICATING LIGHTS DO NOT INDICATE POSITIVE STATE OR POSITIVE RESPONSE. EXTINGUISHED LIGHT MEANS VALVE IS ACTUATED.	FIX	CORRECTIONS SHOULD BE MADE IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
16SS	9-3	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OF FUNCTION.	FIX	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
17SS	9-5	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	FIX	FABRICATE A NEW LABEL THAT DESCRIBES PANEL FUNCTION. NEW LABELING SHOULD MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
18SS	9-3	ANNUNCIATORS NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEM.	NO ACTION	A MINOR DISCREPANCY. THE TWO ALARM BOXES ARE ADJACENT, AND ARE LOCATED IN THE SAME PANEL
19SS	9-3	ANNUNCIATOR NOMENCLATURE, ACRONYMNS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	FIX	FABRICATE NEW ANNUCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
21SS	9-3	ANNUNCIATOR LEGEND TILE TERMINOLOGY IS NOT CONSISTENT WITH THE INPUT SIGNAL FUNCTION.	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES AND ENSURE CONFORMANCE WITH SYSTEM DESIGNATION & CONTROLS LABELING.
22SS	9-3	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.	NO ACTION **	** FOR PANEL 9-3 WHERE THE ANNUNCIATORS ARE LOCATED, VISUAL INDICATORS ARE AVAILABLE ON THE PANEL TO VARIFY THE HIGH OR LOW INPUTS.
23SS	ALL PANELS	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.	FIX	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB's ON TOP ROW, AND "TEST" ON BOTTOM RAW. SEE CNS HF STANDARDS.

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24SS	9-4	SUBGROUPS WITHIN SYSTEM ARE NOT PROPERLY LAID-OUT SO THAT FLOW PATHS CAN BE EASILY CONSTRUCTED.	FIX	RELOCATE SWITCHES SO THAT FLOW PATH CAN BE LAID-OUT IN ACCORDANCE WITH CNS-HF STANDARDS
25SS	9-4	CONTROLS & DISPLAYS NOT GROUPED IN FUNCTIONAL OR SEQUENTIAL RELATIONSHIP.	FIX	INTEGRATE WITH HED 24SS
26SS	9-4	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	FIX	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
27SS	9-4	CONTROLS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	INTEGRATE WITH HED 38SS. RELOCATE CONTROL AND ASSOCIATED ALARM IN RADWASTE SUBSECTION OF THE PANEL IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
28SS	9-4	LABELS AND LEGEND PLATES, NOT UNIFORMLY POSITIONED FOR FUNCTIONAL CLARITY.	FIX	SWAP COMPUTER TREND RECORDER WITH RR & FW TEMPERATURE RECORDER. THIS WILL PLACE THE COMPUTER TREND RECORDER IMMEDIATELY TO THE RIGHT OF THE LEGEND PLATE.
29SS	9-4	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS
30SS	9-3 & 9-4	TURBINE SPEED INDICATORS DO NOT FOLLOW CONVENTIONAL PATTERN.	FIX	REVIEW THE DESIGN OF THE SPEED INDICATORS AND REPLACE SCALE OR METER

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31SS	9-4	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OF FUNCTION.	FIX	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
32SS	9-4	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STANDARDS, THAT INCLUDE LABELING AND LIST OF STANDARD ABBREVIATIONS.
33SS	9-4	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	FIX	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
34SS	9-4	PROCESS UNITS INFORMATION NOT EASILY READ	FIX	EXAMINE RECORDER AND DETERMINE COMPLIANCE OF RECORDER DISPLAYED INFORMATION WITH CNS HF STANDARDS AND NUREG 0700. PROCESS UNITS MAY BE PLACED ON FACE OF RECORDER.
35SS	9-4	POINTER COVERS RECORDER SCALE MARKING	FIX	REPLACE POINTER OR RAISE SCALE
36SS	9-4	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.		SUBJECT TO DCRDR ASSESSMENTS.
37SS	9-4	COMBINED LINEAR AND NONLINEAR SCALES ARE USED ON THE SAME RECORDER.	FIX	REVIEW DESIGN OF THE RECORDER SCALE AND REPLACE THE LINEAR OR NONLINEAR SCALE TO MAKE THEM IDENTICAL.
38SS	9-4	ANNUNCIATORS NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEM.	FIX	INTEGRATE WITH HED 27SS IN RELOCATING ALARM AND ALARM BYPASS SELECTOR SWITCH TO THE RW SUBSECTION OF THE PANEL.

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39SS	9-4	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	FIX	INTEGRATE WITH HED 24SS & 25SS FOR POSSIBILITY OF RELOCATING INDICATIONS TO PROVIDE NECESSARY DEMARTICATION OF SUBGROUPS.
40SS	9-5	CONTROLS & DISPLAYS NOT GROUPED IN FUNCTIONAL OR SEQUENTIAL RELATIONSHIP.	FIX	INTEGRATE WITH HED 42SS
41SS	9-5	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
42SS	9-5	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
43SS	9-5	CONTROLS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	INTEGRATE WITH HED 40SS. RELOCATE CONTROLS AND ASSOCIATED DISPLAYS. IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
44SS	9-5	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	FIX	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

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45SS	9-5	LABELS AND LEGEND PLATES, NOT CONSISTENTLY POSITIONED ABOVE OR BELOW DEVICES.	FIX	PLACE LABELS ACCORDING TO CNS HF STANDARDS.
46SS	9-5	LABELS ARE NOT SIZE CODED IN A HIERARCHICAL SYSTEM.	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
47SS	9-5	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	FIX	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS' IDENTIFICATION.
48SS	9-5	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.
4SS	9-5	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	FIX	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
49SS	9-5	PRINTED VALUES DO NOT CORRESPOND TO SCALE VALUES.	FIX	REPLACE CHART PAPER.
50SS	9-5	EMERGENCY SWITCHES ARE NOT PROTECTED FROM INADVERTENT OPERATION.	NO ACTION	SCRAM BUTTONS SHOULD BE READILY ACCESIBLE TO THE OPERATOR. NO ACTION IS REQUIRED.
51SS	9-5	ANNUNCIATOR NOMENCLATURE, ACRONYMS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.

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52SS	9-5	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	NO ACTION	PLACEMENT OF SETPOINTS ON WINDOWS IS NOT NECESSARY. THEY ARE EASILY FOUND IN ALARM PROCEDURES LOCATED AT PANELS.
53SS	9-5	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.	FIX	IDENTIFY THOSE MULTIPLE-CHOICE INDICATION ALARMS THAT ARE CRITICAL TO SAFETY. WHERE VISUAL INDICATORS NOT AVAILABLE ON THE PANEL TO VERIFY THE HIGH OR LOW INPUTS, ALARMS WILL BE SEPARATED TO SINGLE-CHOICE INDICATIONS.
54SS	9-5	REACTOR MODE SWITCH REQUIRES EXCESSIVE FORCE TO OPERATE.	FIX	REVIEW SWITCH DESIGN RELATIVE TO SWITCH DESIGN SPEC. PERFORM NECESSARY DESIGN MODIFICATIONS IN TERMS OF REPLACING SWITCH HANDLE OR SWITCH TYPE.
55SS	9-5	INDICATOR INFORMATION NOT EASILY READ.	FIX	EXAMINE INDICATORS AND DETERMINE COMPLIANCE OF INDICATOR DISPLAYED INFORMATION WITH CNS HF STANDARDS AND NUREG 0700.
56SS	9-5	POINTER COVERS RECORDER SCALE MARKING.	FIX	REPLACE POINTER OR RAISE SCALE.
5SS	VBD-A	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.
20SS	VBD-A	LABELS NOT CONSISTENTLY POSITIONED ABOVE OR BELOW DEVICES.	FIX	RELOCATE EXISTING LABELS IN COMPLIANCE WITH SPECIFIC STATION STANDARDS.
57SS	VBD-A	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.

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58SS	VBD-A	SUBGROUPS WITHIN SYSTEM ARE NOT PROPERLY LAID-OUT SO THAT FLOW PATHS CAN BE EASILY CONSTRUCTED.	FIX	RELOCATE SWITCHES OR IMPROVE EXISTING DEMARCATION SO THAT FLOW PATH CAN BE LAID-OUT IN ACCORDANCE WITH CNS HF STANDARDS
59SS	VBD-A	CONTROLS LOCATED OUTSIDE RECOMMENDED ZONES	FIX	INTEGRATE WITH HED . RELOCATE CONTROLS IN ACCORDANCD WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
60SS	VBD-A	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
61SS	VBD-A	POSSIBLE DUAL MEANING FOR COLOR OF INDICATING LIGHTS.	FIX	REPLACE COLOR OF INDICATING LIGHTS IN ACCORDANCE WITH CNS HF STANDARDS.
62SS	VBD-A	SWITCH HANDLES OBSCURE SWITCH POSITIONS.	FIX	REPLACE SWITCH HANDLES. ENSURE CONFORMANCE WITH CNS HUMAN FACTOR STANDARDS.
63SS	VBD-A	LACK OF COMPONENT IDENTIFICATION LABEL.	FIX	FABRICATE NEW LABELS THAT DESCRIBE THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.
64SS	VBD-A	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
66SS	VBD-A	EXTENSIVE TEMPORARY LABELS ARE BEING USED.	FIX	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
67SS	VBD-A	TEMPORARY CHANGES OR MODIFICATIONS ARE NOT CONTROLLED IN APPLICATION OR INCOPRORATED IN ADMINISTRATIVE PROCEDURES.	FIX	DEVELOP AN ADMINISTRATIVE PROCEDURE THAT ADDRESS THE NEED FOR TEMPORARIES, AND HOW AND WHERE THEY WILL BE USED.
68SS	VBD-A	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATIONS.	FIX	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
69SS	VBD-A	HIGH INDICATORS ON THE PANEL EXPERIENCE GLARE & REFLECTION.	FIX	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF USING NON-GLARE GLASS, TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
70SS	VBD-A	FAILURE MODE OF INSTRUMENTS NOT EVIDENT.	NO ACTION	INDICATORS BASICALLY FAIL DOWNSCALE. CORRELATION WITH OTHER INDICATIONS VERIFY INSTRUMENT FAILURE.
71SS	VBD-A	HIGH RECORDERS ON PANEL EXPERIENCE SOME GLARE AND REFLECTIONS.	FIX	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF USING NON-GLARE GLASS OR TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.

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73SS	VBD-A	INADEQUATE HAND SPACE BETWEEN CONTROLS.	FIX	REVIEW CONTROL DESIGN RELATIVE TO NUREG 0700 GUIDELINES AND MAKE THE NECESSARY CORRECTIONS.
74SS	VBD-A	ANNUNCIATORS NOT GROUPED ABOVE RELATED CONTROLS AND DISPLAYS.	NO ACTION	ANNUNCIATOR ARE ADJACENT TO RELATED CONTROLS AND DISPLAYS. THEY ARE LOCATED ON THE SAME PANEL.
75SS	VBD-A	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	NO ACTION	ALARM SETPOINTS ARE IDENTIFIED ON ALARM PROCEDURES, LOCATED ON PANELS.
76SS	VBD-A	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	FIX	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
77SS	VBD-A	SWITCH DESIGN DOES NOT FOLLOW CONVENTIONAL PATTERN.	FIX	PERFORM THE NECESSARY DESIGN MODIFICATION TO ENSURE SWITCH MOVEMENT FOLLOWS CONVENTIONAL PATTERN. RELABEL SWITCH POSITION ACCORDINGLY.
78SS	VBD-A	SEVERAL NUISANCE ALARMS ARE PRESENT DURING OPERATING STATE.	FIX	REVIEW THE FREQUENCY OF THESE NUISANCE ALARMS, THEIR SETPOINTS RELATIVE TO THE EQUIPMENT LIMITING VALUES.
79SS	VBD-M	CONTROL & DISPLAYS ARE NOT GROUPED BY SYSTEM WITH IDENTICAL LAYOUT FOR REPETITIVE GROUPS.	FIX	INTEGRATE WITH HED 84SS. ENHANCEMENTS IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
80SS	VBD-C	STRINGS AND MATRICES OF COMPONENTS OF SIMILAR FUNCTIONS NOT DIFFERENTIATED BY DEMARCATION OR HIERARCHICAL LABELING.	FIX	INTEGRATE WITH HED 79SS AND 84SS. NEW LABELING SHOULD BE MERGED WITH EXISTING LABELS IN HIERARCHICAL FORM.

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81SS	VBD-C	DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	REVIEW THE NEED FOR MOVING THE TWO SMALL LIGHTS LOCATED ABOVE THE ANTHROPOMETRIC LIMITS. RELOCATE IN ACCORDANCE WITH NUREG 0700.
83SS	VBD-C	A WRITTEN STANDARD DOES NOT EXIST FOR COLOR USE.	FIX	DEVELOP CONTROL ROOM COLOR CODING AS A PART OF CNS HUMAN FACTOR ENGINEERING STANDARDS.
84SS	VBD-C	MIMICS NOT INTEGRATING SYSTEM COMPONENTS.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
85SS	VBD-C	NO ADDITIONAL INDICATION FOR VISUAL DISTINCTION OF DUAL MEANINGS FOR COLORS.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
86SS	VBD-C	LACK OF LABELS FOR IDENTIFYING COMPONENTS FUNCTION.	FIX	FABRICATE NEW LABELS THAT DESCRIBE THE FUNCTION OF EQUIPMENT ITEMS AND COMPONENT ID'S.
87SS	VBD-C	COLOR USE REQUIRES IDENTIFICATION OF OPERATIONAL LIMITS OR WARNINGS.		
88SS	VBD-C	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
65SS	VBD-C	TEMPORARY LABELS NOT REVIEWED PERIODICALLY, MADE PERMANENT OR REMOVED.	FIX	INTEGRATE WITH HED 91SS IN REPLACING TEMPORARIES WITH PERMANENT LABELS.

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90SS	VBD-C	SWITCH HANDLES OBSCURE SWITCH POSITIONS.	FIX	REPLACE SWITCH HANDLES. ENSURE CONFORMANCE WITH CNS HUMAN FACTOR STANDARDS.
91SS	VBD-C	TEMPORARY LABELS ARE BEING USED FOR BREAKER DESIGNATION.	FIX	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
92SS	VBD-C	TEMPORARY LABELS NOT ADMINISTRATIVELY CONTROLLED.	FIX	DEVELOP AN ADMINISTRATIVE PROCEDURE THAT ADDRESSES THE NEED FOR TEMPORARIES, AND HOW AND WHERE THEY WILL BE USED.
93SS	VBD-C	CHART RECORDER'S INKING SYSTEM SOMETIMES CLOGS.	FIX	REPLACE THE TYPE OF INK USED IN THE CHART RECORDERS.
94SS	VBD-C	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.
95SS	VBD-C	CONTROL MOVEMENT DOES NOT FOLLOW CONVENTIONAL PATTERN - CLOCKWISE MOVEMENT CAUSES DECREASE IN PARAMETER VALUE.	FIX	REVIEW THE INDICATOR DESIGN RELATIVE TO MOVEMENT OF THE REGULATOR SWITCH AND CORRECT ACCORDINGLY.
96SS	VBD-C	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	FIX	NORMAL RANGES LIMITING CONDITIONS OF OPERATION, AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
97SS	VBD-C	HIGH RECORDERS ON PANEL EXPERIENCE SOME GLARE AND REFLECTION.	FIX	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF USING NON-GLARE GLASS OR TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.

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98SS	VBD-C	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	FIX	INTEGRATE WITH HED 79SS FOR POSSIBILITY OF RELOCATING CONTROLS & INDICATIONS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
99SS	VBD-C	ANNUNCIATOR NOT GROUP WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEMS.	NO ACTION	A MINOR DISCREPANCY. THE TWO ALARM BOXES ARE ADJACENT, AND ARE LOCATED IN THE SAME PANEL.
100SS	VBD-C	ANNUNCIATORS ARE NOT GROUPED ABOVE RELATED DISPLAYS.	NO ACTION	A MINOR DISCREPANCY. ALARMS ARE ADJACENT TO DISPLAYS.
101SS	VBD-C	WARNING & DIAGNOSTIC ALARMS NOT SEGREGATED FROM INFORMATIONAL AND ADVISORY ALARMS.	NO ACTION	A MINOR DISCREPANCY. INFORMATIONAL ALARMS ARE ALSO WARNING ALARMS.
102SS	VBD-C	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE SIZE.	FIX	THE ANNUNCIATOR TILE IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.
103SS	VBD-C	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.	NO ACTION*	*NO SAFETY SIGNIFICANCE. SAME ACTION WILL BE TAKEN UNDER ALL CONDITIONS COVERED BY THIS ALARM.
104SS	VBD-C	ALARM WINDOWS WITH MULTIPLE CHOICE INDICATION.	FIX	IDENTIFY THOSE MUILTIPLE-CHOICE INDICATION ALARMS THAT ARE CRITICAL TO SAFETY. WHERE VISUAL INDICATORS NOT AVAILABLE ON THE PANEL TO VERIFY THE HIGH OR LOW INPUTS, ALARMS WILL BE SEPARATED TO SINGLE-CHOICE INDICATIONS.

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105SS	VBD-C	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.	FIX	REVIEW THE NEED FOR TWO ALARM RESPONSE SYSTEMS ON THIS PANEL VS. ONE ALARM SYSTEM USED ON ALL OTHER PANELS. STANDARDIZE SWITCH ARRANGEMENT SIMILAR TO OTHER PANELS.
106SS	VBD-B	RELATED SUBGROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
107SS	VBD-B	MIMICS NEED IMPROVEMENT SO FLOW PATHS & ARRANGEMENTS ARE ORDERLY & EASILY RECOGNIZED.	FIX	INTEGRATE WITH HED 106SS. RELOCATE SWITCHES SO THAT FLOW PATH CAN BE LAID-OUT IN ACCORDANCE WITH CNS-HF STANDARDS.
108SS	VBD-B	CONTROL AND DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	REVIEW THE NEED FOR MOVING DISPLAYS AND CONTROLS. RELOCATE IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
109SS	VBD-B	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
110SS	VBD-B	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
111SS	VBD-B	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION AND FUNCTION.	FIX	FABRICATE A NEW LABEL THAT DESCRIBES THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.
112SS	VBD-B	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	FIX	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
113SS	VBD-B	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	FIX	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
114SS	VBD-B	LABELS NOT CONSISTENTLY POSITIONED ABOVE OR BELOW LABELS.	FIX	RELOCATE EXISTING LABELS IN COMPLIANCE WITH SPECIFIC STATION STANDARDS.
115SS	VBD-B	SEVERAL TEMPORARY LABELS ARE NOT ORIENTED HORIZONTALLY.	FIX	REVIEW THE NEED FOR THE TEMPORARY LABELS. IF NEEDED, REPLACE WITH LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
116SS	VBD-B	TEMPORARY LABELS ARE NOT MINIMIZED.	FIX	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
117SS	VBD-B	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	FIX	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
118SS	VBD-B	TEMPORARY LABELS NOT CONSISTENT AND CONTROLLED IN NOMENCLATURE, FONT AND COLOR.	FIX	INTEGRATE WITH HED 115SS AND 116SS FOR REPLACING WITH PERMANENT LABELS, AND ENHANCING THOSE NOT REPLACED IN ACCORDANCE WITH NUREG 0700 GUIDELINES.

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LIST OF SUPPLEMENTAL HEDS
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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
119SS	VBD-B	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.
120SS	VBD-B	TEMPORARY LABELS NOT REVIEWED PERIODICALLY, MADE PERMANENT OR REMOVED.	FIX	INTEGRATE WITH HED 116SS IN REPLACING TEMPORARIES WITH PERMANENT LABELS.
121SS	VBD-B	SEVERAL INDICATORS EXPERIENCE GLARE AND PARALLAX WHEN STATIONED AT THE PANEL.	FIX	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
122SS	VBD-B	UNIDENTIFIABLE PROCESS UNITS.	FIX	IDENTIFY PROCESS UNITS ON FACE OF RECORDER.
123SS	9-5	INDICATOR DESIGN DOES NOT FOLLOW CONVENTIONAL PATTERN.	NO ACTION	NO ACTION IS REQUIRED. INDICATOR DESIGN IS A STANDARD METER FOR SRM PERIOD.
124SS	VBD-B	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OR FUNCTION.	FIX	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
125SS	VBD-B	SWITCHES FOR EMERGENCY OR ABNORMAL USE NOT CONSISTENTLY MARKED.	FIX	CORRECTION IS TO BE MADE IN ACCORDANCE WITH CNS HF STANDARDS
126SS	VBD-B	ANNUNCIATORS NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEM.	NO ACTION	A MINOR DISCREPANCY. ALARM BOXES ARE ADJACENT, AND ARE LOCATED IN THE SAME PANEL.
127SS	9-3	BARRIERS NOT PROVIDED BETWEEN CONTIGUOUS LEGEND PUSHBUTTONS.	NO ACTION	INADVERTENT ACTUATION OF ADJACENT DRIVE SELECTOR PUSHBUTTON WILL NOT RESULT IN DRIVING ANY OF THE SRM'S OR IRM'S. ADDITIONAL ACTUATION OF A DRIVE COMMAND SWITCH WILL BE REQUIRED TO RESULT IN AN ACTION.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
128SS	VBD-B	ANNUNCIATOR NOMENCLATURE, ACRONYMNS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
129SS	VBD-B	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE STYLE AND THE APPLICATION OF TYPE SIZE.	FIX	THE ANNUNCIATOR TILE IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.
130SS	VBD-A	EMERGENCY SWITCHES ARE NOT PROTECTED FROM INADVERTENT OPERATION.	NO ACTION	SWITCHES ARE RECESSED, UNLIKELY TO MOVE THEM ACCIDENTALLY. PROTECTIVE COVERS NOT REQUIRED AS SWITCHES SHOULD BE READILY ACCESSIBLE TO THE OPERATOR. NO ACTION IS REQUIRED.
131SS	VBD-B	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	NO ACTION	PLACEMENT OF SETPOINTS ON WINDOWS IS NOT NECESSARY. THEY ARE EASILY FOUND IN ALARM PROCEDURES LOCATED AT PANELS.
132SS	VBD-C	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	FIX	FABRICATE A NEW LABEL THAT DESCRIBES THE PANEL FUNCTION, AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SCHEME.
133SS	VBD-R	LABELS ARE NOT VISUALLY DISTINCTIVE - RED LETTERS ON BLACK BACKGROUND.	FIX	REPLACE EXISTING LABEL WITH A NEW LABEL THAT IS CONSISTENT W/LABELING THROUGHOUT THE CTRL ROOM.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
134SS	VBD-B	CHART RECORDER'S INKING SYSTEM SOMETIMES CLOGS.	FIX	REPLACE THE TYPE OF INK USED IN THE CHART RECORDERS
135SS	VBD-R	CONTROLLER'S HEIGHT CAUSES DIFFICULTY IN IDENTIFYING MODE POSITIONS.	FIX	INTEGRATE WITH HED 194SS IN RELOCATING THE CONTROLLERS.
136SS	VBD-K	DEMARCATIONS, MIMICS NOT IDENTICAL IN LAYOUT FOR REPETITIVE GROUPINGS OF COMPONENTS.	FIX	INTEGRATE WITH HED 2S. RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
137SS	VBD-K	CONTROLS & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS. FOR THOSE METERS THAT WILL OT BE RELOCATED, UTILIZE TILTING OF DISPLAYS TO IMPROVE READABILITY.
138SS	VBD-K	CONTROLS & DISPLAY COMPONENTS NOT LOCATED WITHIN AN ARM REACH OF FEEDBACK INDICATIONS	FIX-PER FEASIBILITY STDY RECOM	INTEGRATE WITH HED 1S. RELOCATE CONTROLS AND ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATION.
139SS	VBD-K	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
140SS	VBD-K	POSSIBLE DUAL MEANING FOR COLOR OF INDICATING LIGHTS.	FIX	REPLACE COLOR OF INDICATING LIGHTS IN ACCORDANCE WITH CNS HF STANDARDS.
141SS	VBD-K	LACK OF COMPONENT IDENTIFICATION.	FIX	FABRICATE NEW LABELS THAT DESCRIBE THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.
142SS	VBD-K	LEGEND PLATES IDENTIFYING OPERATIONAL LIMITS NOT CLEAR OR STANDARD.	FIX	DEVELOP STANDARD FORMAT LEGEND PLATES THAT IDENTIFY EQUIPMENTS' OPERATIONAL LIMITS. IMPLEMENT PER THE STANDARDS.
143SS	VBD-K	LOW INDICATORS ARE DIFFICULT TO READ WHEN STATIONED AT PANEL.	FIX	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. INTEGRATE WITH HED 2S.
144SS	VBD-K	ANNUNCIATORS WARNING & DIAGNOSTIC ALARMS ARE NOT SEGREGATED FROM INFORMATIONAL AND ADVISORY ALARMS.	NO ACTION	MINOR DISCREPANCY. NO ACTION REQUIRED.
145SS	VBD-K	ANNUNCIATOR NOMENCLATURE AND ABBREVIATIONS ARE NOT STANDARDIZED.	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
146SS	VBD-K	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	FIX	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FOR THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
147SS	VBD-K	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.	FIX	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB'S ON TOP ROW, AND TEST ON BOTTOM ROW. SEE CNS HF STANDARDS.
148SS	VBD-R	DEMARCATION LINES OR MIMICS NOT USED TO ENCLOSE RELATED DISPLAYS.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
149SS	VBD-R	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
150SS	VBD-R	ANALOG CONTROLLERS LOCATED ABOVE MAXIMUM LIMITS.	FIX	INTEGRATE WITH HED 55S. RELOCATE CONTROL AND ASSOCIATED DISPLAYS IN ACCORDANCE WITH NUREG-0700 ANTHROPOMETRIC LIMITS.
151SS	VBD-R	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	FIX	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
152SS	VBD-R	LABELS NOT CONSISTENTLY POSITIONED ABOVE OR BELOW LABELS.	FIX	RELOCATE EXISTING LABELS IN COMPLIANCE WITH SPECIFIC STATION STANDARDS.
153SS	VBD-R	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
154SS	VBD-R	CONTROL SWITCH POSITION NOT CLEARLY MARKED.	FIX	PURCHASE OR FABRICATE NEW LEGEND LABELS WHICH REFLECT CONTROL POSITION. THE NEW LABELS SHOULD BE CONSISTENT WITH EXISTING LABELS IN TERMS OF COLOR, LETTER SIZE, TERMINOLOGY, SIZE AND LOCATION. ALL LABELS SHOULD BE PERMANENTLY ATTACHED.
155SS	VBD-R	ANNUNCIATOR NOMENCLATURE, ACRONYMS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
156SS	VBD-R	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.	FIX	IDENTIFY THOSE MULTIPLE-CHOICE INDICATION ALARMS THAT ARE CRITICAL TO SAFETY. WHERE VISUAL INDICATORS NOT AVAILABLE ON THE PANEL TO VERIFY THE HIGH OR LOW INPUTS, ALARMS WILL BE SEPARATED TO SINGLE-CHOICE INDICATIONS.
157SS	VBD-R	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	NO ACTION	ALARM SETPOINTS ARE IDENTIFIED ON ALARM PROCEDURES, LOCATED ON PANELS.
158SS	VBD-P1 &P2	CONTROLS AND DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	REVIEW THE NEED FOR MOVING DISPLAYS AND CONTROLS. RELOCATE IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
159SS	9-02	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION, MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
160SS	9-02	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPC. COLOR CODING.
161SS	9-21	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	FIX	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
162SS	VBD-P1 &P2	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION, MIMICS, ZONE MARKING OF DISPLAYS, FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
163SS	VBD-P1 &P2	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	FIX	FABRICATE NEW LABELS IDENTIFING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
164SS	VBD-P1 &P2	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	FIX	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
165SS	VBD-P1 &P2	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	FIX	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
166SS	9-21	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	FIX	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.
167SS	9-21	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
168SS	VBD-P1 &P2	LABELS ARE NOT SIZE CODED IN A HIERARCHICAL SYSTEM.	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
169SS	9-21	ARM RECORDER DOES NOT HAVE PROCESS UNITS ON SCALE	FIX	IDENTIFY PROCESS UNITS ON SCALE
170SS	9-21	INDICATOR POINTERS OBSCURE GRADUATION MARKS AND SCALE NUMERALS.	FIX	ENHANCEMENT IN AGREEMENT WITH NUREG 0700 GUIDELINES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
171SS	9-21	METER INDICATION ON PANEL EXPERIENCE GLARE AND REFLECTION	FIX	RELOCATE THE INDICATOR. INTEGRATE WITH HED 280SS
172SS	9-21	ANNUNCIATOR NOMENCLATURE, ACRONYMS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
194SS	VBD-R	CONTROLS LOCATED OUTSIDE RECOMMENDED ZONES	FIX-PER FEASIBILITY STDY RECOM	INTEGRATE WITH HED 148SS. RELOCATE CONTROL AND ASSOCIATED DISPLAYS IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
195SS	VBD-R	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	FIX	INTEGRATE WITH HED 194SS FOR POSSIBILITY OF RELOCATING CONTROLS & INDICATIONS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
175SS	VBD-S	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	FIX	REVIEW LABEL CONTENT AND FABRICATE NEW LABELING THAT DESCRIBES FUNCTION OF THE TWO RED LIGHTS.
176SS	VBD-S	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
177SS	VBD-S	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	FIX	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
178SS	VBD-S	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.
179SS	VBD-R	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	FIX	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.
180SS	VBD-S	ANNUNCIATOR NOMENCLATURE, ACRONYMNS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
181SS	VBD-S	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	FIX	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
182SS	VBD-S	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.	FIX	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB's ON TOP ROW, AND TEST ON BOTTOM ROW. SEE CNS HF STANDARDS.

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LIST OF SUPPLEMENTAL HEDS
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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
183SS	VBD-S	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	FIX	INTEGRATE WITH HED 173SS FOR POSSIBILITY OF RELOCATING CONTROLS & INDICATIONS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
184SS	VBD-R	INCONSISTENT TYPE STYLE AND APPLICATION OF TYPE SIZE.	FIX	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
186SS	VBD-J	CONTROLS, & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS.
187SS	VBD-J	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
188SS	VBD-J	LACK OF COMPONENT IDENTIFICATION LABEL	FIX	FABRICATE A NEW LABEL THAT DESCRIBES THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.
189SS	VBD-J	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT & IMPLEMENTATION OF HUMAN FACTOR PLANT STANDARDS, THAT INCLUDE LABELING AND LIST OF STANDARD ABBREVIATIONS.
190SS	9-4	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE SIZE	FIX	THE ANNUNCIATOR TILE IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
191SS	VBD-J	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.
72SS	VBD-J	UNIDENTIFIABLE PROCESS UNITS	FIX	IDENTIFY PROCESS UNITS ON FACE OF RECORDER. PROCESS UNITS SHOULD BE IN PSIG.
196SS	VBD-R	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MILTIPLES OF 1, 2 OR 5.	FIX	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
173SS	VBD-S	CONTROLS & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS. FOR THOSE METERS THAT WILL NOT BE RELOCATED, UTILIZE TILTING OF DISPLAYS TO IMPROVE READABILITY.
82SS	VBD-R	INDICATOR INFORMATION NOT EASILY READ.	FIX	EXAMINE INDICATORS AND DETERMINE COMPLIANCE OF INDICATOR DISPLAYED INFORMATION WITH CNS HF STANDARDS AND NUREG 0700.
174SS	VBD-S	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
89SS	VBD-S	EXTENSIVE TEMPORARY LABELS ARE BEING USED.	FIX	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
185SS	VBD-S	CONTROL SWITCH POSITION NOT PERMANENTLY MARKED.	FIX	PURCHASE OR FABRICATE NEW LEGEND LABELS WHICH REFLECT CONTROL POSITION. THE NEW LABELS SHOULD BE CONSISTENT WITH EXISTING LABELS IN TERMS OF COLOR, LETTER SIZE, TERMINOLOGY, SIZE AND LOCATION. ALL LABELS SHOULD BE PERMANENTLY ATTACHED.
349SS	VBD-J	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES	FIX	USE LABEL CODING TO DISTINGUISH BET DISC AND ACTUATOR INDICATING LIGHTS.
348SS	VBD-J	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES	NO ACTION	FOR PANEL VBD-J WHERE THE ANNUNCIATORS ARE LOCATED, VISUAL INDICATORS FOR THE DISCHARGE HEADER PRESSURE ARE AVAILABLE ON THE ADJACENT PANEL VBD-M TO VERIFY THE HIGH OR LOW PRESSURE ALARMS.
194SS	VBD-J	ANNUNCIATOR NOMENCLATURE, ACRONYMNS, OR ABBREVIATIONS ARE NOT STANDARDIZED	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
193SS	VBD-J	ANNUNCIATORS NOT GROUPED ABOVE RELATED CONTROLS AND DISPLAYS	NO ACTION	NO CORRECTIVE ACTION IS TAKEN AS VBD-J AND VBD-M ARE ADJACENT, AND NO SPACE IS AVAILABLE ON VBD-M TO RELOCATE ALARMS.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
192SS	VBD-J	POINTER COVERS RECORDER SCALE MARKING	FIX	REPLACE POINTER OR RAISE SCALE
350SS	VBD-A	UNIDENTIFIABLE PROCESS UNITS	FIX	IDENTIFY PROCESS UNITS ON FACE OF RECORDER.
197SS	VBD-R	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE SIZE.	FIX	THE ANNUNCIATOR TILE IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.
347SS	VBD-R	LABELS ARE NOT SIZE CODED IN A HIERARCHICAL SYSTEM	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
198SS	VBD-H	SUBGROUPS WITHIN SYSTEM ARE NOT PROPERLY LAID-OUT SO THAT FLOW PATHS CAN BE EASILY CONSTRUCTED	FIX	RELOCATE SWITCHES OR IMPROVE EXISTING DEMARCATION SO THAT FLOW PATH CAN BE LAID-OUT IN ACCORDANCE WITH CNS HF STANDARDS.
199SS	VBD-H	STRINGS AND MATRICES OF COMPONENTS OF SIMILAR FUNCTIONS NOT DIFFERENTIATED BY DEMARCATION OR HEIRARCHICAL LABELING.	FIX	INTEGRATE WITH HED AND . NEW LABELING SHOULD BE MERGED WITH EXISTING LABELS IN HIERARCHICAL FORM.
200SS	VBD-H	POSSIBLE DUAL MEANING FOR COLOR OF INDICATING LIGHTS.	FIX	REPLACE COLOR OF INDICATING LIGHTS IN ACCORDANCE WITH CNS HF STANDARDS.
201SS	VBD-H	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	FIX	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
202SS	VBD-H	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	FIX	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
203SS	VBD-H	INCONSISTENT TYPE STYLE AND APPLICATION OF TYPE SIZE.	FIX	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
204SS	VBD-H	LABELS AND LEGEND PLATES, NOT UNIFORMLY POSITIONED FOR FUNCTIONAL CLARITY.	FIX	RELOCATE LABELS AND LEGEND PLATES IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
205SS	VBD-H	EXTENSIVE TEMPORARY LABELS ARE BEING USED.	FIX	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
206SS	VBD-H	UNIDENTIFIABLE PROCESS UNITS	FIX	IDENTIFY PROCESS UNITS ON FACE OF RECORDER.
207SS	VBD-H	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.
208SS	VBD-H	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	FIX	REPLACE SCALES IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
209SS	VBD-H	PRINTED VALUES DO NOT CORRESPOND TO SCALE VALUES.	FIX	REPLACE CHART PAPER.
210SS	VBD-H	APPLICATION OF SYMBOLS FOR PROCESS ELEMENTS NOT CONSISTENT AMONG PANELS.	FIX	DEVELOP STANDARD SYMBOLS FOR PROCESS ELEMENTS AS A PART OF CNS HUMAN FACTOR ENGINEERING STANDARDS. IMPLEMENT PER THE STANDARDS.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
211SS	VBD-H	LABELING OF SUBSYSTEM GROUPINGS NOT CONSISTENTLY APPLIED	FIX	INTEGRATE WITH HED 185. FABRICATE NEW LABELING THAT DESCRIBES FUNCTION OF THE SYBSYSTEMS IN ACCORDANCE WITH CNS HF STANDARDS.
212SS	VBD-H	LEGEND PLATES IDENTIFYING OPERATIONAL LIMITS NOT CLEAR OR STANDARD.	FIX	DEVELOP STANDARD FORMAT FOR LEGEND PLATES THAT IDENTIFY EQUIPMENTS' OPERATIONAL LIMITS. IMPLEMENT PER THE STANDARDS.
213SS	VBD-H	SWITCH LABELS FOR FAN COIL UNITS ARE HARD TO READ.	FIX	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
214SS	VBD-H	INDICATOR POINTERS OF HONEWELL CONTROLLERS OBSCURE SCALE NUMERALS	NO ACTION REQUIRED*	*CONTROLLERS ARE NOT IN USE. THEY HAVE BEEN REMOVED.
215SS	VBD-K	MIMIC HAS NO ARROWS NOTING DIRECTION OF FLOW.	FIX	MODIFICATION BY ENHANCEMENT TECHNIQUES IN AGREEMENT WITH SPECIFIC STATION STANDARDS AND NUREG 0700 GUIDELINES.
216SS	VBD-K	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.
217SS	VBD-K	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	FIX	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
218SS	VBD-K	INDICATOR INFORMATION NOT EASILY READ.	FIX	EXAMINE INDICATORS AND DETERMINE COMPLIANCE OF INDICATOR DISPLAYED INFORMATION WITH CNS HF STANDARDS AND NUREG 0700.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
219SS	VBD-K	SUBGROUPS WITHIN SYSTEM ARE NOT PROPERLY LAID-OUT SO THAT FLOW PATHS CAN BE EASILY CONSTRUCTED.	FIX-PER FEASIBILITY STDY RECOM	RELOCATE SWITCHES OR IMPROVE EXISTING DEMARCATION SO THAT FLOW PATH CAN BE LAID-OUT IN ACCORDANCE WITH CNS HF STANDARDS.
220SS	VBD-K	MIMICS NOT INTEGRATING SYSTEM COMPONENTS.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
221SS	VBD-K	ANNUNCIATOR NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEMS.	NO ACTION	A MINOR DISCREPANCY. THE TWO ALARM BOXES ARE ADJACENT, AND ARE LOCATED IN THE SAME PANEL.
222SS	VBD-K	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	FIX	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
223SS	VBD-K	CONTROLLER'S HEIGHT CAUSES DIFFICULTY IN IDENTIFYING MODE POSITIONS.	FIX	INTEGRATE WITH HED 2S IN RELOCATING THE CONTROLLERS.
224SS	VBD-K	INCONSISTENT USE OF ACRONYMS AND ABEREVIATIONS.	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
225SS	VBD-K	APPLICATION OF SYMBOLS FOR PROCESS ELEMENTS NOT CONSISTENT AMONG PANELS.	FIX	DEVELOP STANDARD SYMBOLS FOR PROCESS ELEMENTS AS A PART OF CNS HUMAN FACTOR ENGINEERING STANDARDS. IMPLEMENT PER THE STANDARDS.
226SS	VBD-K	INDICATOR POINTERS OF HONEYWELL CONTROLLERS OBSCURE SCALE NUMERALS.	NO ACTION REQUIRED*	*CONTROLLERS ARE NOT IN USE. THEY HAVE BEEN REMOVED.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
227SS	VBD-M	TEMPORARY LABELS NOT PERIODICALLY REVIEWED TO MAKE PERMANENT OR REMOVE.	FIX	DEVELOP SPECIFIC CNS ADMINISTRATIVE PROCEDURES TO GOVERN THE USE OF TEMPORARY LABELS WHICH WILL BE IN COMPLIANCE WITH NUREG 0700 GUIDELINES.
228SS	VBD-M	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	FIX	INTEGRATE WITH HED 3S TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
229SS	VBD-M	ANNUNCIATORS NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEM.	NO ACTION	A MINOR DISCREPANCY. ALARM BOXES ARE ADJACENT.
230SS	VBD-M	WARNING AND DIAGNOSTIC ALARMS NOT SEGREGATED FROM INFORMATION AND ADVISORY ALARMS.	NO ACTION	DISCREPANCY COULD NOT BE VERIFIED. THE INFORMATION ALARMS ON THIS PANEL ARE ALSO CONSIDERED WARNING AND DIAGNOSTIC ALARMS.
231SS	VBD-M	ANNUNCIATOR LEGEND TILE TERMINOLOGY IS NOT CONSISTENT WITH THE INPUT SIGNAL FUNCTION.	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES AND ENSURE CONFORMANCE WITH SYSTEM DESIGNATION & CONTROLS LABELING.
232SS	VBD-M	LABELS AND LEGEND PLATES, NOT UNIFORMLY POSITIONED FOR FUNCTIONAL CLARITY.	FIX	RELOCATE EXISTING LABELS IN COMPLIANCE WITH SPECIFIC STATION STANDARDS.
233SS	VBD-M	LABELS ARE NOT SIZE CODED IN A HIERARCHICAL SYSTEM	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
234SS	VBD-M	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS.
235SS	VBD-M	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	FIX	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
236SS	VBD-M	HIGH INDICATORS ON THE PANEL EXPERIENCE GLARE & REFLECTION	FIX	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
237SS	VBD-M	CONTROL & DISPLAYS ARE NOT GROUPED BY SYSTEM WITH IDENTICAL LAYOUT FOR REPETITIVE GROUPS.	FIX	INTEGRATE WITH HED 84SS. ENHANCEMENTS IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
238SS	VBD-M	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	FIX	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
239SS	VBD-M	TEMPORARY LABELS NOT CONSISTENT AND CONTROLLED IN NOMENCLATURE, AND COLOR.	FIX	REVIEW THE NEED FOR TEMPORARY LABELS AND REPLACE WITH PERMANENT LABELS. ENHANCE THOSE NOT REPLACED IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
240SS	VBD-M	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
241SS	VBD-M	CONTROL SWITCH POSITION NOT CLEARLY MARKED.	FIX	PURCHASE OR FABRICIATE NEW LENGEND LABELS WHICH REFLECT CONTROL POSITION. THE NEW LABELS SHOULD BE CONSISTENT WITH EXISTING LABELS IN TERMS OF COLOR, LETTER SIZE, TERMINOLOGY, SIZE AND LOCATION. ALL LABELS SHOULD BE PERMANENTLY ATTACHED.
242SS	VBD-M	LEGEND PLATES IDENTIFYING OPERATIONAL LIMITS NOT CLEAR OR STANDARD.	FIX	DEVELOP STANDARD FORMAT FOR LEGEND PLATES THAT IDENTIFY EQUIPMENTS' OPERATIONAL LIMITS. IMPLEMENT PER THE STANDARDS.
243SS	FIRE PANEL	ANNUNCIATOR RESPONSE CONTROLS NOT CODED FOR EASE OF RECOGNITION.	FIX	INTEGRATE WITH HED 247SS. ENCLOSE THE CONTROLS WITH DEMARCATION LINES IN ACCORDANCE WITH CNS HF STANDARDS.
244SS	FIRE PANEL	UNIDENTIFIABLE PROCESS UNITS.	FIX	IDENTIFY PROCESS UNITS ON FACE OF RECORDER.
245SS	FIRE PANEL	SEVERAL NUISANCE ALARMS ARE PRESENT DURING OPERATING STATE.	FIX	REVIEW THE FREQUENCY OF THESE NUISANCE ALARMS, THEIR SETPOINTS RELATIVE TO THE EQUIPMENT LIMITING VALUES.
246SS	FIRE PANEL	NO STANDARD GUIDE FOR WRITING ANNUNCIATOR PROCEDURES IS IN USE.	FIX	PROVIDE A STANDARD FOR WRITING ANNUNCIATOR PROCEDURES.
247SS	FIRE PANEL	ANNUNCIATOR RESPONSE BUTTONS AND DEMARCATION OF CONTROLS ARE INCONSISTENT WITH OTHER PANELS.	FIX	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB'S ON TOP ROW, AND "TEST" ON BOTTOM ROW. SEE CNS HF STANDARDS.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
248SS	FIRE PANEL	ANNUNCIATOR LEGEND TILE TERMINOLOGY IS NOT CONSISTENT WITH THE INPUT SIGNAL FUNCTION.	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES AND ENSURE CONFORMANCE WITH SYSTEM DESIGNATION & CONTROLS LABELING.
249SS	FIRE PANEL	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	NO ACTION	PLACEMENT OF SETPOINTS ON WINDOWS IS NOT NECESSARY. THEY ARE EASILY FOUND IN ALARM PROCEDURES LOCATED AT PANELS.
250SS	FIRE PANEL	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	NO ACTION	ALARM SETPOINTS ARE IDENTIFIED ON ALARM PROCEDURES, LOCATED ON PANELS.
251SS	FIRE PANEL	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES	FIX	IDENTIFY THOSE MULTIPLE-CHOICE INDICATION ALARMS THAT ARE CRITICAL TO SAFETY. WHERE VISUAL INDICATORS NOT AVAILABLE ON THE PANEL TO VERIFY THE HIGH OR LOW INPUTS, ALARMS WILL BE SEPARATED TO SINGLE-CHOICE INDICATIONS.
252SS	FIRE PANEL	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE SIZE.	FIX	THE ANNUNCIATOR TILES IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.
253SS	FIRE PANEL	ANNUNCIATOR NOMENCLATURE, ACRONYMS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	FIX	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
254SS	VBD-P1 &P2	LABELS ARE NOT PERMANENTLY MOUNTED	FIX	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
255SS	FIRE PANEL	LABELS AND INDICATING LIGHTS ARE VISUALLY OBSTRUCTED BY HAND DURING SWITCH MOVEMENT	FIX	REVIEW POSITION OF LABELS AND ILS RELATIVE TO ASSOCIATED CONTROLS AND MAKE THE NECESSARY CORRECTIONS PER NUREG-0700 GUIDELINES.
256SS	VBD-P1 &P2	EXTENSIVE TEMPORARY LABELS ARE BEING USED.	FIX	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
257SS	VBD-P1 &P2	TEMPORARY CHANGES OR MODIFICATIONS ARE NOT CONTROLLED IN APPLICATION OR INCORPORATED IN ADMINISTRATIVE PROCEDURES.	FIX	DEVELOP AN ADMINISTRATIVE PROCEDURE THAT ADDRESS THE NEED FOR TEMPORARIES, AND HOW AND WHERE THEY WILL BE USED.
258SS	VBD-P1 &P2	INDICATOR POINTER OBSCURE SCALE NUMERALS.	FIX	ENHANCEMENT IN AGREEMENT WITH NUREG 0700 GUIDELINES.
259SS	FIRE PANEL	INCONSISTENCY IN INSERTION OF KEYS IN KEY-OPERATED SWITCHES.	NO ACTION	HED IS NOT OF SAFETY SIGNIFICANCE. DIRECTION OF KEY INSERTION IS APPARENT THROUGH SWITCH DESIGN.
260SS	VBD-P1 &P2	INDICATING LIGHTS DO NOT INIDICATE POSITIVE STATE OR POSITIVE RESPONSE. EXTINGUISHED LIGHT MEANS VALVE IS ACTUATED.	FIX	CORRECTIONS SHOULD BE MADE IN ACCORDANCE WITH NUREG 0700 GUIDELINES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
261SS	FIRE PANEL	NO POSITIVE MEANS OF DIAGNOSING FAILED INDICATING LIGHTS AVAILABLE.	REASSESS PER NRC REQU. 9-5-85	EXISTING ANNUNCIATOR SYS AT CNS INCORPORATE TEST CAPABILITIES SO NO ACTION IS REQUIRED. FOR STATUS INDICATING LIGHTS REDUNDANT INDICATIONS ARE AVAILABLE TO DISTINGUISH FAILED LIGHTS. FOR PANEL 9-5, CONTROL ROD POSITIONS WILL BE IDENTIFIED ON SPDS.
262SS	VBD-P1 &P2	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	FIX	REPLACE SCALES PER CNS STANDARDS
263SS	FIRE PANEL	FAILURE MODE OF INSTRUMENTS NOT EVIDENT.	NO ACTION	INDICATORS BASICALLY FAIL DOWNSCALE. CORRELATION WITH OTHER INDICATIONS VERIFY INSTRUMENT FAILURE.
264SS	FIRE PANEL	HIGH INDICATORS ON THE PANEL EXPERIENCE GLARE & REFLECTION.	FIX	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
265SS	VBD-P1 &P2	WARNING AND DIAGNOSTIC ALARMS NOT SEGREGATED FROM INFORMATION AND ADVISORY ALARMS.	NO ACTION	DISCREPANCY COULD NOT BE VERIFIED. THE INFORMATION ALARMS ON THIS PANEL ARE ALSO CONSIDERED WARNING AND DIAGNOSTIC ALARMS.
266SS	FIRE PANEL	ANNUNCIATOR PANELS CAN BE SEEN BUT NOT READ FROM POSITIONS OTHER THAN DIRECTLY IN FRONT OF PANELS.	NO ACTION	OPERATOR HAS TO WALK TO PANEL TO SILENCE ALARM, WHERE HE CAN READ ANNUNCIATOR TILE. THIS HED IS NOT IN VIOLATION WITH NUREG 0700.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
267SS	FIRE PANEL	TEMPORARY LABELS ARE USED FOR POWER SUPPLY IDENTIFICATION AND ON ALARM TILES.	FIX	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
268SS	FIRE PANEL	LABELS AND LEGEND PLATES, NOT UNIFORMLY POSITIONED FOR FUNCTIONAL CLARITY.	FIX	SWAP COMPUTER TREND RECORDER WITH RR & FW TEMPERATURE RECORDER. THIS WILL PLACE THE COMPUTER TREND RECORDER IMMEDIATELY TO THE RIGHT OF THE LEGEND PLATE.
269SS	FIRE PANEL	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	FIX	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
270SS	VBD-P1 &P2	MULTI-CHANNEL RECORDER DOES NOT DISPLAY CHANNEL BEING PLOTTED. INFORMATION IS NOT EASILY EXTRACTED.	FIX*	EXAMINE RECORDER DESIGN AND MAKE NECESSARY MODIFICATIONS TO DISPLAY RECORDER CHANNEL BEING PLOTTED.
271SS	FIRE PANEL	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	FIX	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
272SS	FIRE PANEL	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	FIX	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.

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273SS	FIRE PANEL	LACK OF COMPONENT IDENTIFICATION LABELS	FIX	FABRICATE NEW LABELS THAT DESCRIBES THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.
274SS	FIRE PANEL	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
275SS	FIRE PANEL	NO PLANT STANDARD EXISTS FOR COLOR CODING	FIX	DEVELOP CONTROL ROOM COLOR CODING AS A PART OF CNS HUMAN FACTOR ENGINEERING STANDARDS.
276SS	VBD-P1 &P2	CONTROL & DISPLAYS ARE NOT GROUPED BY SYSTEM WITH IDENTICAL LAYOUT FOR REPETITIVE GROUPS.	FIX	INTEGRATE WITH HED 158SS. ENHANCEMENTS IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
277SS	FIRE PANEL	STRINGS AND MATRICES OF COMPONENTS OF SIMILAR FUNCTIONS NOT DIFFERENTIATED BY DEMARCATION OR HEIRARCHICAL LABELING.	FIX	INTEGRATE WITH HED 279SS AND 276SS. NEW LABELING SHOULD BE MERGED WITH EXISTING LABELS IN HIERARCHICAL FORM.
278SS	VBD-O& G	PEN COLORS NOT CONSISTENT AMONG RECORDERS.	FIX	STANDARDIZE PEN COLORS AMONG RECORDERS.
279SS	FIRE PANEL	CONTROL AND DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	INTEGRATE WITH THE DESIGN MODIFICATION PLANNED FOR THIS PANEL. RELOCATE IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
280SS	9-21	DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES	FIX-PER FEASIBILITY STDY RECOM	RELOCATE TEMP INDICATOR IN ACCORDANCE WITH THE FS RECOMMENDATIONS.
281SS	9-21	TEMP. INDICATOR FOR STEAM LEAK DETECTION LACKS LABEL IDENTIFICATION.	FIX	FABRICATE NEW LABELS THAT DESCRIBE THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.
282SS	9-21	OPERATIONAL LIMITS NOT IDENTIFIED THROUSH LABELING LEGEND PLATES.	FIX	FABRICATE A LEGEND PLATE THAT IDENTIFIES THE VARIOUS TEMPERATURE LIMITS IN VARIOUS PLANT MONITORED REGIONS ON THIS PANEL.
283SS	9-21	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
284SS	9-21	NAME TAGS BELOW RECORDERS CANNOT BE READ WHEN STATIONED AT THE PANEL.	FIX	RELOCATE RECORDER'S NAMETAGS - PLACE ON FACE OF RECORDERS.
285SS	9-21	TEMPORARY LABELS ARE NOT MINIMIZED	FIX	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
286SS	9-21	TEMPORARY LABELS NOT REVIEWED PERIODICALLY, MADE PERMANENT OR REMOVED.	FIX	INTEGRATE WITH HED 285SS IN REPLACING TEMPORARIES WITH PERMANENT LABELS.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
287SS	9-21	TEMPERATURE INDICATORS NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATION.	NO ACTION	TEMPERATURE INDICATOR CANNOT BE MARKED FOR NORMAL RANGE OR ENTRY TO EMERGENCIES SINCE IT HAS SEVERAL SETPOINTS. OPERATIONAL LIMITS WILL BE IDENTIFIED ON A LEGEND PLATE. (REFER TO HED 163SS)
288SS	9-21	TEMPERATURE INDICATOR EXPERIENCES GLARE & REFLECTION.	FIX	RELOCATION OF THE INDICATOR (HED 280SS) WILL RESOLVE THIS DISCREPANCY.
289SS	VBD-P1 &P2	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
290SS	VBD-P1 &P2	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
291SS	VBD-P1 &P2	SWITCH LABELS FOR FAN COIL UNITS ARE HARD TO READ.	FIX	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
292SS	VBD-P1 &P2	HIGH RECORDERS ON PANEL EXPERIENCE SOME GLARE AND REFLECTIONS.	FIX	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF USING NON-GLARE GLASS OR TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.

APPENDIX C
LIST OF SUPPLEMENTAL HEDS
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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
293SS	VBD-Q&G	MULTI-SCALE AND LEGARITHMIC SCALE INDICATIONS ARE DIFFICULT TO READ.	FIX	INTEGRATE WITH HED 119S.
294SS	VBD-Q&G	RECORDER INFORMATION NOT READABLE FROM STANDING POSITION WITHOUT DOOR OPEN.	FIX	INTEGRATE WITH HED 4S IN RELOCATING RECORDER.
295SS	VBD-Q&G	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	FIX	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
296SS	VBD-Q&G	CONTROLS & DISPLAYS NOT GROUPED IN FUNCTIONAL OR SEQUENTIAL RELATIONSHIP.	FIX	INTEGRATE WITH HED 24SS.
297SS	VBD-Q&G	CONTROLS & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS. FOR THOSE METERS THAT WILL NOT BE RELOCATED, UTILIZE TILTING OF DISPLAYS TO IMPROVE READABILITY.
298SS	VBD-Q&G	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	FIX	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
299SS	VBD-Q&G	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	FIX	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
300SS	VBD-Q&G	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
301SS	VBD-Q&G	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	FIX	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
302SS	VBD-Q&G	LABELS ARE NOT SIZE CODED IN A HIERARCHICAL SYSTEM.	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
303SS	VBD-Q&G	TEMPORARY LABELS ARE BEING USED FOR BREAKER DESIGNATION.	FIX	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
304SS	VBD-Q&G	TEMPORARY LABELS NOT CONSISTENT AND CONTROLLED IN NOMENCLATURE, FONT AND COLOR.	FIX	INTEGRATE WITH HED 115SS AND 116SS FOR REPLACING WITH PERMANENT LABELS, AND ENHANCING THOSE NOT REPLACED IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
305SS	VBD-Q&G	CONTROLS REQUIRING MANUAL OPERATION NOT EASILY REACHED.	FIX	RELOCATE CONTROLLERS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATION.

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LIST OF SUPPLEMENTAL HEDS
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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
306SS	VBD-Q&G	INDICATORS ON THE PANEL EXPERIENCE GLARE & REFLECTION.	FIX	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
307SS	VBD-Q&G	INSTRUMENTS ARE NOT SCALED IN PROCESS UNITS RELATING TO SYSTEM OPERATION.	FIX	SCALE CHANGES SHOULD BE PERFORMED BY MINOR DESIGN CHANGE. ENSURE APPROPRIATE CALIBRATION & SURVEILLANCE PROCEDURES ARE UPDATED. ENSURE APPROPRIATE OPERATOR TRAINING WILL BE CONDUCTED.
308SS	VBD-Q&G	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	FIX	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
309SS	VBD-Q&G	PRINTED VALUES DO NOT CORRESPOND TO SCALE VALUES.	FIX	REPLACE CHART PAPER.
310SS	VBD-Q&G	NO POSITIVE MEANS OF DIAGNOSING FAILED INDICATING LIGHTS AVAILABLE.	REASSESS PER NRC REGU. 9-5-85	EXISTING ANNUNCIATOR SYS AT CNS INCORPORATE TEST CAPABILITIES SO NO ACTION IS REQUIRED. FOR STATUS INDICATING LIGHTS REDUNDANT INDICATIONS ARE AVAILABLE TO DISTINGUISH FAILED LIGHTS. FOR PANEL 9-5, CONTROL ROD POSITIONS WILL BE IDENTIFIED ON SPDS.
311SS	VBD-Q&G	DISPLAYS LOCATED BELOW RECOMMENDED HEIGHTS.	FIX	INTEGRATE WITH HED 186SS FOR RELOCATING RECORDER.
312SS	VBD-Q&G	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE SIZE.	FIX	THE ANNUNCIATOR TILE IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
313SS	VBD-Q&G	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	FIX	INTEGRATE WITH HED 106SS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
314SS	VBD-Q&G	UNIDENTIFIABLE PROCESS UNITS.	FIX	IDENTIFY PROCESS UNITS ON FACE OF RECORDER.
315SS	VBD-Q&G	ANNUNCIATOR RESPONSE CONTROLS NOT CODED FOR EASE OF RECOGNITION.	FIX	INTEGRATE WITH HED . ENCLOSE THE CONTROLS WITH DEMARCATION LINES IN ACCORDANCE WITH CNS HF STANDARDS.
316SS	9-21	MULTI-CHANNEL RECORDER DOES NOT DISPLAY CHANNEL BEING PLOTTED DURING ABNORMAL CONDITIONS.	FIX	REVIEW SERVICES PROVIDED BY THESE RECORDERS, IN VIEW THAT BACKUP INDICATIONS ARE AVAILABLE TO VERIFY RECORDED VALUE.
317SS	9-02	DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	FIX	RELOCATE RMA METERS IN ACCORDANCE WITH CNS HF ANTHROPOMETRIC LIMITS.
318SS	9-02	POINTERS COVER RECORDER SCALES.	FIX	RAISE SCALE OR REPLACE POINTERS.
319SS	9-02	METER SCALES ARE HARD TO READ. NEED INTERMEDIATE MARKINGS	FIX	REPLACE SCALE WITH NEW ONES THAT DISPLAY INTERMEDIATE MARKINGS.
320SS	9-02	POSSIBLE DUAL MEANING FOR COLOR OF INDICATING LIGHTS.	FIX	REPLACE COLOR OF INDICATING LIGHTS IN ACCORDANCE WITH CNS HF STANDARDS.
321SS	9-02	LACK OF LABELS FOR IDENTIFYING COMPONENT FUNCTION.	FIX	FABRICATE A NEW LABEL THAT DESCRIBES THE FUNCTION OF THE EQUIPMENT ITEM AND COMPONENT I.D.

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LIST OF SUPPLEMENTAL HEDS
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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
322SS	9-02	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	FIX	FABRICATE NEW LABELS IDENTIYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.
323SS	9-02	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	FIX	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
324SS	9-02	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	FIX	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
325SS	9-02	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	FIX	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
326SS	9-02	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	FIX	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
327SS	9-02	LABELS AND LEGEND PLATES, NOT UNIFORMLY POSITIONED FOR FUNCTIONAL CLARITY.	FIX	RELOCATE LABELS AND LEGEND PLATES IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
328SS	9-02	TEMPORARY LABELS NOT REVIEWED PERIODICALLY, MADE PERMANENT OR REMOVED.	FIX	REVIEW SERVICES BEING PROVIDED BY USE OF TEMPORARY LABELS. REPLACE IN ACCORDANCE WITH NUREG 0700 GUIDELINES.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
329SS	9-02	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	FIX	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
330SS	9-02	INSTRUMENTS ARE NOT SCALED IN PROCESS UNITS RELATING TO SYSTEM OPERATION.	FIX	SCALE CHANGES SHOULD BE PERFORMED BY MINOR DESIGN CHANGE. ENSURE APPROPRIATE CALIBRATION & SURVEILLANCE PROCEDURES ARE UPDATED. ENSURE APPROPRIATE OPERATOR TRAINING WILL BE CONDUCTED.
331SS	9-02	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	FIX	INTEGRATE WITH HED 329SS. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
332SS	9-02	RECORDER SCALES NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	FIX	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOP'S ON RECORDER SCALES.
333SS	N/A	LIMITED STORAGE SPACE FOR PROCEDURES AND REFERENCE MATERIAL.	FIX	IMPROVE THE SPACE FOR STORING THE PROCEDURES AND EXPAND THE LAYOUT SPACE FOR REFERENCE MATERIAL.
334SS	N/A	LIMITED LAY DOWN SPACE FOR USE OF PROCEDURES AND REFERENCE MATERIALS AT THE PANELS.	FIX	UTILIZE EITHER A ROLLING TRAY OR A SLIDING CART ON THE NEW PANEL RAILING SYSTEM TO PROVIDE LAY DOWN SPACE FOR THE PROCEDURES AT THE PANELS.
335SS	N/A	EACH PROCEDURE SHOULD BE CLEARLY MARKED IN THE BINDER OR FOLDER.	DONE, HED RESOLVED*	*PROCEDURE BINDERS HAVE BEEN NUMBERED AND MARKED.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
336SS	N/A	EMERGENCY PROCEDURES SHOULD BE IN A SEPARATE BINDER OR FOLDER.	DONE, CORRECTION MADE*	*EMERGENCY PROCEDURES HAVE BEEN PLACED IN SEPARATE BINDERS WITH SPECIFIC COLOR CODING IDENTIFYING THEM AS EPs.
337SS	N/A	EQUIPMENT AND ADMINISTRATIVE LIMITS FOR OPERATION SHOULD BE LISTED.	FIX	A TWO-YEAR PROCEDURE UPGRADE PROGRAM WILL BE CONDUCTED AT THE STATION. INCLUSION OF EQUIPMENT AND ADMINISTRATIVE LIMITS WILL BE CONSIDERED AS PART OF THIS PROGRAM.
338SS	N/A	REFERENCE MATERIAL IDENTIFIED IN THE PROCEDURES ARE NOT CONVENIENTLY LOCATED.	FIX	COMBINE WITH HED 333SS.
339SS	N/A	NO CONTROLLED METHOD IN PLACE TO ADDRESS OPERATORS ADDITION TO THE CR PANELS.	FIX	AN ADMINSTRATIVE PROCEDURE WILL BE WRITTEN TO ADDRESS MINOR ADDITIONS TO THE CR PANELS. MAJOR ADDITIONS ARE ADMINISTRATIVELY CONTROLLED BY DESIGN CHANGES.
340SS	N/A	COMMUNICATION TO IN-PLANT NOISE AREAS NOT EASILY ACCESSIBLE.	FIX	CONSIDER INSTALLING FLASHING LIGHTS IN NOISE AREAS FOR NOTIFYING PERSONNEL TO CONTACT THE CR. A HEARING PROTECTOR ENCLOSURE SHOULD BE INSTALLED IN EACH OF THE NOISE AREAS TO FACILITATE COMMUNICATION.
341SS	N/A	INDISTINGUISHABLE AUDIBLE SIGNALS BETWEEN FRONT AND BACK PANELS.	FIX	EQUIP BACK PANEL WITH DIFFERENT TONE ALARMING SYSTEM.
342SS	N/A	PRIORITIZATION OF AUDIBLE SIGNALS.	NO ACTION	PRIORITIZATION OF AUDIBLE SIGNALS IS NOT DESIRED. DEPENDING ON THE SPECIFIC ALARM AND EXISTING PLANT CONDITIONS, THE OPERATOR WILL RESPOND.

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HED ID.	PANEL ID.	DESCRIPTION	ACTION	RESOLUTION/NOTES
343SS	N/A	INADEQUATE EMERGENCY LIGHTING AT ALL PANEL SURFACES.	FIX	PERFORM THE NECESSARY DESIGN MODIFICATIONS TO IMPROVE THE EMERGENCY LIGHTING IN THE CONTROL ROOM.
344SS	N/A	BACKGROUND NOISE LEVEL SLIGHTLY ABOVE LIMIT. ROUTINELY PROVIDE NOISE LEVEL BELOW AN INTERFERENCE LEVEL FOR NORMAL CONVERSATION. MEASURE IN BOTH dbA (MAXIMUM 65) AND dbC AT EACH OPERATING AREA.	NO ACTION	THE HIGHEST NOISE LEVEL IN THE CONTROL IS 70 dB IN THE AREA AROUND THE PRINTER. THIS PRINTER IS BEING REPLACED BY A NEW QUIETER PRINTER CONNECTED TO THE PMIS.
345SS	N/A	COMMUNICATIONS SYSTEMS NOT SUBJECTED TO PERIODIC MAINTENANCE TESTS.	FIX	MAINTENANCE TESTING BETWEEN CR-TSC-EOF WILL BE ADDED TO THE PREVENTIVE MAINTENANCE LIST.
346SS	N/A	CR COMMUNICATIONS EQUIPMENT NOT IN WELL MARKED LOCATIONS.	FIX	EQUIP THE CR WITH SUFFICIENT EXTENSION CORDS AND LOCATE THEM IN SPECIFICALLY MARKED PLACES.

APPENDIX D

HED RESULTS AND ASSESSMENT SUMMARY

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
129	PROCESS UNITS AND MULTIPLIERS NOT SPECIFIED.	S81.4	6.5.1.4	1295	9-02	ENHANC.	B	FIX	2ND REFUELING	IDENTIFY PROCESS UNITS.
425	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.1	6.5.1.6, 6.5.2.3, 6.6.6 *	1595S	9-02	ENHAC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION, MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
426	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2	6.5.1.6, 6.5.2.3, 6.6.6 *	1605S	9-02	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPC. COLOR CODING.
591	DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	A1.1, A3.6	6.1.2	3175S	9-02	DESIGN MOD.	II	FIX	2ND REFUELING	RELOCATE RMA METERS IN ACCORDANCE WITH ENS HF ANTHROPOMETRIC LIMITS.
592	POINTERS COVER RECORDER SCALES.	B2.5	6.5.2.2, SEE COMMENTS	3185S	9-02	DESIGN MOD	II	FIX	2ND REFUELING	RAISE SCALE OR REPLACE POINTERS.
593	METER SCALES ARE HARD TO READ. NEED INTERMEDIATE MARKINGS	B2.11	6.5.1.2, SEE COMMENTS	3195S	9-02	ENHANC	II	FIX	2ND REFUELING	REPLACE SCALE WITH NEW ONES THAT DISPLAY INTERMEDIATE MARKINGS.

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1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
594	POSSIBLE DUAL MEANING FOR COLOR OF INDICATING LIGHTS.	A4.3	6.5.3.2, SEE COMMENTS	320SS	9-02	ENHANC.	B	FIX	2ND REFUELING	REPLACE COLOR OF INDICATING LIGHTS IN ACCORDANCE WITH CNS HF STANDARDS.
595	LACK OF LABELS FOR IDENTIFYING COMPONENT FUNCTION.	A5.1	LABELING INFORMATION	321SS	9-02	ENHANC.	B	FIX	2ND REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES THE FUNCTION OF THE EQUIPMENT ITEM AND COMPONENT I.D.
596	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	A5.3	6.6.1.1, 6.6.3.1, SEE COMMENTS	322SS	9-02	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS IDENTIYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.
597	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	A5.4	6.6.1.1, 6.6.3.1	323SS	9-02	ENHANC.	B	FIX	2ND REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
598	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4#	324SS	9-02	ENAHNC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
599	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	A5.6	6.6.4.1, SEE COMMENTS	325SS	9-02	ENHANC.	B	FIX	2ND REFUELING	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
600	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	A5.10	6.6.2.1, 6.6.3.1 SEE COMMENTS	326SS	9-02	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
601	LABELS AND LEGEND PLATES, NOT UNIFORMLY POSITIONED FOR FUNCTIONAL CLARITY.	A5.11	6.6.2.1, SEE COMMENTS	327SS	9-02	DESIGN MOD	III	FIX	2ND REFUELING	RELOCATE LABELS AND LEGEND PLATES IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
602	TEMPORARY LABELS NOT REVIEWED PERIODICALLY, MADE PERMANENT OR REMOVED.	A6.1 & A6.7	6.6.5.2	328SS	9-02	ENHANC.	B	FIX	2ND REFUELING	REVIEW SERVICES BEING PROVIDED BY USE OF TEMPORARY LABELS. REPLACE IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
603	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	329SS	9-02	ENHANC.	B	FIX	2ND REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
604	INSTRUMENTS ARE NOT SCALED IN PROCESS UNITS RELATING TO SYSTEM OPERATION.	B2.3	6.5.1.2, SEE MISC/COMMENTS	330SS	9-02	ENHANC.	B	FIX	2ND REFUELING	SCALE CHANGES SHOULD BE PERFORMED BY MINOR DESIGN CHANGE. ENSURE APPROPRIATE CALIBRATION & SURVEILLANCE PROCEDURES ARE UPDATED. ENSURE APPROPRIATE OPERATOR TRAINING WILL BE CONDUCTED.
605	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	331SS	9-02	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 329SS. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
606	RECORDER SCALES NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3 (SEE MISC/COMMENTS)	332SS	9-02	ENHANC.	B	FIX	2ND REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOP'S ON RECORDER SCALES.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
51	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	SA3	6.4.2.2, 6.5.1.6, 6.6.6.4 *	51S	9-02 & 9-21	ENHANC.	II	FIX	2ND REFUELING	
5	CONTROLS, & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES. CONTROL SWITCHES LOCATED 26" BELOW MIN. LIMITS AND 11" ABOVE MAX. LIMITS. VISUAL DISPLAYS LOCATED 28" BELOW MIN. LIMITS AND 6" ABOVE MAX. LIMITS.	A1.1 & A3.6	6.1.2.5	5S	9-10 & 9-11	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	CONCEPTUAL DESIGN OF PANELS WILL UTLIZE TILTING OF TOP INSTRUMENTS AND RELOCATION OF LOWER CONTROLS.
9	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.2	6.6.6.1, 6.6.6.2, 6.8.1.3 *	9S	9-10 & 9-11	ENHANC.	B	FIX	2ND REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
14	CONTROLS AND DISPLAYS OF SIMILAR FUNCTIONS NOT GROUPED IN CONSISTENT ORDER.	A3.2	6.9.2, SEE COMMENT*	14S	9-10 & 9-11	DESIGN MOD.	II	FIX	2ND REFUELING	INTEGRATE WITH HED 5S. MODIFICATION WILL REQUIRE DESIGN CHANGE. ENUSRE APPROPRIATE DRAWINGS ARE UPDATED AND OPERATIONS DEPARTMENT IS AWARE OF THE CHANGE.
16	DEMARCATION OR SEQUENCING WITHIN SYSTEM GROUPING NOT APPARENT.	A3.3	6.8.2.1, 6.9.2.1, SEE COMMENTS	16S	9-10 & 9-11	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 9S.
27	PERMANENT LABELS NOT USED TO PROVIDE OPERATIONAL LIMITS OR WARNINGS.	A5.2	6.6.3.9	27S	9-10 & 9-11	ENHANC.	B	FIX	2ND REFUELING	DEVELOP STANDARD FORMAT FOR LEGEND PLATES THAT IDENTIFY EQUIPMENTS' OPERATIONAL LIMITS. IMPLEMENT PER THE STANDARDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
30	LABELS AND LEGEND PLATES NOT USED TO IDENTIFY SYSTEM DESIGNATION	A5.3	6.6.1.1, 6.6.3.1, SEE COMMENTS	30S	9-10 & 9-11	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.
31	LABELS NOT USED TO IDENTIFY PANEL BY NUMBER AND FUNCTION.	A5.4	6.6.1.1, 6.6.3.1	31S	9-10 & 9-11	ENHANC.	B	FIX	2ND REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
32	LABELS AND LEGEND PLATES NOT EASILY READ WHEN STATIONED AT PANEL.	A5.9	6.6.4.1, SEE COMMENTS	32S	9-10 & 9-11	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
39	EXTENSIVE TEMPORARY LABELS USED	A5.12 & A6.1	6.6.5.1, SEE COMMENTS	39S	9-10 & 9-11	ENHANC.	B	FIX	2ND REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
54	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	S03	6.4.2.2, 6.5.1.6, 6.6.6.4 a	54S	9-10 & 9-11	ENHANC.	II	FIX	2ND REFUELING	INTEGRATE WITH HED 5S AND 14S TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
56	CONTROLS REQUIRING MANUAL OPERATION NOT EASILY REACHED. CONTROL SWITCHES LOCATED 26" BELOW MIN. LIMITS AND 11" ABOVE MAXIMUM LIMITS.	B1.1	6.1.2	56S	9-10 & 9-11	DESIGN MOD.	II	FIX-PER FEASIBILIT Y STDY RECOM	2ND REFUELING	RELOCATE CONTROLLERS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
65	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	65S	9-10 & 9-11	ENHANC.	B	FIX	2ND REFUELING	ZONE MARKINGS SHOULD BE USED TO SHOW OPERATIONAL IMPLICATIONS OF VARIOUS READINGS, SUCH AS "OPERATIONAL RANGE", "UPPER LIMITS", "LOWER LIMITS" AND "DANGER ZONE". ZONE MARKINGS SHOULD BE CONSPICIOUS AND DISTINCTIVELY DIFFERENT FOR DIFFERENT ZONES.
69	INSTRUMENTS NOT SCALED IN PROCESS UNITS RELATING TO SYSTEM OPERATION.	B2.3	6.5.1.2, SEE MISC/COMMENTS	69S	9-10 & 9-11	OTHER MOD.	II	PROVIDE ALT.	2ND REFUELING	SPDS WILL PROVIDE THE INFORMATION IN OPERATIONAL UNITS OF CURIE/HR.
104	CONTROL SWITCHES ABOVE AND BELOW RECOMMENDED HEIGHTS. CONTROL SWITCHES LOCATED 26" BELOW MINIMUM LIMITS AND 11" ABOVE MAX. LIMITS.	B5.3	6.1.2	104S	9-10 & 9-11	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 5S. FOR RELOCATING CONTROLS.
107	MSL RADIATION MONITOR SWITCH NOT OF ADEQUATE SIZE.	B5.6	6.4.1	107S	9-10 & 9-11	DESIGN MOD.	II	FIX	2ND REFUELING	SWITCH SIZE NOT THE PROBLEM. SWITCHGUARD COVER IS MAKING IT DIFFICULT TO OPERATE THE SWITCH. REPLACE OR MODIFY THE GUARD COVER.
120	METERS ARE FAR BELOW SIGHT - MAKING IT DIFFICULT TO READ SCALE	SB1.1	6.1.2	120S	9-10 & 9-11	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 5S IN PERFORMING THE DESIGN MODIFICATION TO RELOCATE METERS
121	INDICATOR SCALES NOT EASILY READ WHEN STATIONED AT THE PANEL.	SB1.1	6.1.2	121S	9-10 & 9-11	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 5S.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
130	PROCESS UNITS AND MULTIPLIERS NOT SPECIFIED.	5B1.4	6.5.1.4	130S	9-10 & 9-11	ENHANC.	B	FIX	2ND REFUELING	IDENTIFY PROCESS UNITS.
60	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1		60S	9-21	ENHANC.	B	FIX	2ND REFUELING	ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
75	PRINTED VALUES NOT EASILY READ	B3.1	6.5.4	75S	9-21	DESIGN MOD.	II	NO ACTION, HED RESOLVED*	NONE	*RECORDERS HAVE BEEN REPLACED. HED NOT APPLICABLE.
82	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	82S	9-21	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 92S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
92	RECORDER SCALES NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3 (SEE MISC/COMMENTS)	92S	9-21	ENHANC.	B	FIX	2ND REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOP'S ON RECORDER SCALES.
118	INDICATOR SCALES NOT EASILY READ WHEN STATIONED AT THE PANEL. ONE METER INDICATION LOCATED 17° ABOVE MAX. LIMITS.	5B1.1	6.1.2	118S	9-21	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 280SS.
427	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	A5.4	6.6.1.1, 6.6.3.1	161SS	9-21	ENHANC.	B	FIX	2ND REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
432	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	A5.3	6.6.1.1, 6.6.3.1, SEE COMMENTS	166SS	9-21	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
433	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4 &	167SS	9-21	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
435	ARM RECORDER DOES NOT HAVE PROCESS UNITS ON SCALE	B2.3	6.5.1.4	169SS	9-21	ENHANC.	B	FIX	2ND REFUELING	IDENTIFY PROCESS UNITS ON SCALE
436	INDICATOR POINTERS OBSCURE GRADUATION MARKS AND SCALE NUMERALS.	B2.5	6.5.2.2, SEE COMMENTS	170SS	9-21	ENHANC.	B	FIX	2ND REFUELING	ENHANCEMENT IN AGREEMENT WITH NUREG 0700 GUIDELINES.
437	METER INDICATION ON PANEL EXPERIENCE GLARE AND REFLECTION	B3.14	6.1.2.3	171SS	9-21	ENHANC.	B	FIX	2ND REFUELING	RELOCATE THE INDICATOR. INTEGRATE WITH HED 280SS
438	ANNUNCIATOR NOMENCLATURE, ACRONYMS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	C2.1	6.3.3.4 (SEE COMMENTS)	172SS	9-21	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
554	DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES	A1.1, A3.6	6.1.2	280SS	9-21	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	RELOCATE TEMP INDICATOR IN ACCORDANCE WITH THE FS RECOMMENDATIONS.
555	TEMP. INDICATOR FOR STEAM LEAK DETECTION LACKS LABEL IDENTIFICATION.	A5.1	6.6.1.1, 6.6.3.1, SEE COMMENTS	281SS	9-21	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS THAT DESCRIBE THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
556	OPERATIONAL LIMITS NOT IDENTIFIED THROUGH LABELING LEGEND PLATES.	A5.2	6.6.3.9	282SS	9-21	ENHANC.	B	FIX	2ND REFUELING	FABRICATE A LEGEND PLATE THAT IDENTIFIES THE VARIOUS TEMPERATURE LIMITS IN VARIOUS PLANT MONITORED REGIONS ON THIS PANEL.
557	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	A5.6	6.6.3.2, 6.6.3.3, 6.6.3.4 a	283SS	9-21	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
558	NAME TAGS BELOW RECORDERS CANNOT BE READ WHEN STATIONED AT THE PANEL.	A5.9	6.6.4.1, SEE COMMENTS	284SS	9-21	ENHANC.	B	FIX	2ND REFUELING	RELOCATE RECORDER'S NAMETAGS - PLACE ON FACE OF RECORDERS.
559	TEMPORARY LABELS ARE NOT MINIMIZED	A6.1	6.6.5.1, SEE COMMENTS	285SS	9-21	ENHANC.	B	FIX	2ND REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
560	TEMPORARY LABELS NOT REVIEWED PERIODICALLY, MADE PERMANENT OR REMOVED.	A6.7	6.6.5.2	286SS	9-21	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 285SS IN REPLACING TEMPORARIES WITH PERMANENT LABELS.
561	TEMPERATURE INDICATORS NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	287SS	9-21	ENHANC.	B	NO ACTION	NONE	TEMPERATURE INDICATOR CANNOT BE MARKED FOR NORMAL RANGE OR ENTRY TO EMERGENCIES SINCE IT HAS SEVERAL SETPOINTS. OPERATIONAL LIMITS WILL BE IDENTIFIED ON A LEGEND PLATE. (REFER TO HED 163SS)

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
562	TEMPERATURE INDICATOR EXPERIENCES GLARE & REFLECTION.	B2.2	6.1.2.2	28955	9-21	ENHANC.	B	FIX	2ND REFUELING	RELOCATION OF THE INDICATOR (HED 28055) WILL RESOLVE THIS DISCREPANCY.
590	MULTI-CHANNEL RECORDER DOES NOT DISPLAY CHANNEL BEING PLOTTED DURING ABNORMAL CONDITIONS.	SB2.2	6.5.4.2	31655	9-21	DESIGN MOD.	II	FIX	2ND REFUELING	REVIEW SERVICES PROVIDED BY THESE RECORDERS, IN VIEW THAT BACKUP INDICATIONS ARE AVAILABLE TO VERIFY RECORDED VALUE.
6	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.2	6.6.6.1, 6.6.6.2, 6.8.1.3 *	6S	9-3	ENHANC.	A	FIX	1ST REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
11	SUBGROUPS WITHIN SYSTEM ARE NOT PROPERLY LAID-OUT SO THAT FLOW PATHS CAN BE EASILY CONSTRUCTED.	A2.7,A 2.11,	6.6.6.4, 6.8.2.2 *	11S	9-3	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 6S. STANDARDIZE COLOR & SHAPE OF CONTROLS. INCLUDE IN FEASIBILITY STUDY OF HED GR.1.
15	GROUPINGS OF CONTROLS AND DISPLAYS OF SIMILAR FUNCTIONS NOT APPARENT	A3.3	6.8.2.1, 6.9.2.1	15S	9-3	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HEDs 6S & 11S.
18	STRINGS AND MATRICES OF COMPONENTS OF SIMILAR FUNCTIONS NOT DIFFERENTIATED BY DEMARCATION OR HIERARCHICAL LABELING.	A3.4, A5.7,	6.6.1.2, 6.6.6.2 *	18S	9-3	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 6S AND 15S. NEW LABELING SHOULD BE MERGED WITH EXISTING LABELS IN HIERARCHICAL FORM.
22	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2,A 4.3,	6.5.1.6, 6.5.2.3, 6.6.6*	22S	9-3	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION, MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC.COLOR CODING.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
44	ANNUCIATOR PANELS CAN BE SEEN BUT NOT READ FROM POSITIONS OTHER THAN DIRECTLY IN FRONT OF PANELS.	A7.3	6.3.3.5, 6.3.3.1 *	44S	9-3	OTHER MOD.	III	NO ACTION	NONE	OPERATOR HAS TO WALK TO PANEL TO SILENCE ALARM, WHERE HE CAN READ ANNUNCIATOR TILE.(REFER TO COMMENTS)
48	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	A3.7,S A7,	6.4.2.2, 6.5.1.6, 6.6.6.4 *	48S	9-3	DESIGN MOD.	II	FIX	1ST REFUELING	INTEGRATE WITH HED 11S FOR POSSIBILITY OF RELOCATING CONTROLS & INDICATIONS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
57	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 *	57S	9-3	ENHANC.	B	FIX	1ST REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
77	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	77S	9-3	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 88S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
88	RECORDER SCALES NOT MARKET TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3	88S	9-3	ENHANC.	A	FIX	1ST REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOPs OR RECORDER SCALES.
105	HANDLES NEAR EDGES NOT PROTECTED WITH GUARDS TO PREVENT INADVERTENT OPERATION.	B5.4	6.4.1.2 *	105S	9-3	DESIGN MOD.	II	FIX	1ST REFUELING	EQUIP WITH A RAIL.
270	LACK OF MIMICS INTEGRATING SYSTEM COMPONENTS.	A2.4 & A2.11	6.6.6.4, 6.8.2.2 *	1SS	9-3	ENCHANC.	A	FIX	1ST REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
271	LACK OF LABELS FOR IDENTIFYING COMPONENT FUNCTION AND POWER SUPPLY TO INSTRUMENTS.	A5.1,	6.6.1.1, 6.6.3.1	2SS	9-3	ENHANC.	A	FIX	1ST REFUELING	IDENTIFY POWER SUPPLY SOURCE ON METERS AND RECORDERS. CORRECT LABELS IDENTIFICATION.
272	ADS RELIEF VALVE CONTROLS OUT OF CONSISTENT SEQUENCING.	A3.2	6.8.2.2 *	3SS	9-3	ENHANC.	A	FIX	1ST REFUELING	OPENING SEQUENCE OF ADS VALVES IS MORE SIGNIFICANT THAN VALVE ARRANGEMENT. LABELS FOR VALVE OPENING SEQUENCE WILL BE PLACED ON TOPS OF SWITCHES' COVERS.
273	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4 *	6SS	9-3	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STANDARDS, THAT INCLUDE LABELING AND LIST OF STANDARD ABBREVIATIONS.
274	PROCESS UNITS INFORMATION NOT VISIBLE THROUGH RECORDER WINDOWS.	SB2.1,	6.5.4.1, 6.5.4.2 *	7SS	9-3	ENHANCEMENT	A	FIX	1ST REFUELING	EXAMINE RECORDER AND DETERMINE THE CAUSE OF OBSTRUCTION. PROCESS UNITS MAY BE PLACED ON FACE OF RECORDER.
275	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	A5.10	6.6.2.1, 6.6.3.1 *	8SS	9-3	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
276	INDICATING CONTROLLER DOES NOT FOLLOW CONVENTIONAL PATTERN.	B5.1	6.4.1.1 *	9SS	9-3	DESIGN MOD.	II	FIX	1ST REFUELING	FLOW CONTROLLER FIC-142 IS FOR RX HEAD SPRAY MODE OF OPERATION - WHICH IS NOT PRESENTLY IN USE. CONTROLLER WILL BE REMOVED.
277	INDICATOR DESIGN DOES NOT FOLLOW CONVENTIONAL PATTERN.	B2.6	INDIC.PO INTER MOVEM'T ON SCALE	10SS	9-3	DESIGN MOD.	II	FIX	1ST REFUELING	REPLACE METER

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
278	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	C2.8	6.3.1.4 *	11SS	9-3	ENHANC.	A	FIX	1ST REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
279	INCONSISTENT SEQUENCING OF ANNUNCIATOR BOXES	A3.2	6.8.2.2 *	12SS	9-3	OTHER MOD	III	NO ACTON	NONE	NO SAFETY RISK. ALARM PROCEDEDURES ARE SEPARATE FOR EACH BOX, AND ARE ATTACHED TO EACH SUBSECTION OF THE PANEL. ANNUNCIATOR BOX WILL BE MADE MORE VISIBLE THROUGH DISTINCTIVE LABELING.
280	INSTRUMENTS ARE NOT SCALED IN PROCESS UNITS RELATING TO SYSTEM OPERATION.	B2.3	6.5.1.2 *	13SS	9-3	ENHANC.	A	FIX	1ST REFUELING	SCALE CHANGES SHOULD BE PERFORMED BY MINOR DESIGN CHANGE. ENSURE APPROPRIATE CALIBRATION & SURVEILLANCE PROCEDURES ARE UPDATED. ENSURE APPROPRIATE OPERATOR TRAINING WILL BE CONDUCTED.
281	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 *	14SS	9-3	ENHANC.	A	FIX	1ST REFUELING	REPLACE SCALES PER CNS STANDARDS.
282	INDICATING LIGHTS DO NOT INDICATE POSITIVE STATE OR POSITIVE RESPONSE. EXTINGUISHED LIGHT MEANS VALVE IS ACTUATED.	B4.2	6.5.3.1 *	15SS	9-3	DESIGN MOD.	II	FIX	1ST REFUELING	CORRECTIONS SHOULD BE MADE IN ACCORDANCE WITH NUREG 0700 GUIDELINES.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
283	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OF FUNCTION.	B5.1*	6.4.2.2 *	16SS	9-3	ENHANC.	A	FIX	1ST REFUELING	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
285	ANNUNCIATORS NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEM.	C1.1	6.3.3.3 *	18SS	9-3	OTHER MOD.	III	NO ACTION	NONE	A MINOR DISCREPANCY. THE TWO ALARM BOXES ARE ADJACENT, AND ARE LOCATED IN THE SAME PANEL
286	ANNUNCIATOR NOMENCLATURE, ACRONYMNS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	C2.2	6.3.3.4 *	19SS	9-3	ENHANC.	II	FIX	1ST REFUELING	FABRICATE NEW ANNUCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
287	ANNUNCIATOR LEGEND TILE TERMINOLOGY IS NOT CONSISTENT WITH THE INPUT SIGNAL FUNCTION.	C2.5	6.3.3.4 *	21SS	9-3	ENHANC.	B	FIX	1ST REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES AND ENSURE CONFORMANCE WITH SYSTEM DESIGNATION & CONTROLS LABELING.
288	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.	C2.7	6.3.3.4 *	22SS	9-3	OTHER MOD.	III	NO ACTION **	NONE	** FOR PANEL 9-3 WHERE THE ANNUNCIATORS ARE LOCATED, VISUAL INDICATORS ARE AVAILABLE ON THE PANEL TO VARIFY THE HIGH OR LOW INPUTS.
393	BARRIERS NOT PROVIDED BETWEEN CONTIGUOUS LEGEND PUSHBUTTONS.	SB4.1	6.4.3.3, SEE COMMENTS	127SS	9-3	OTHER MOD	III	NO ACTION	NONE	INADVERTENT ACTUATION OF ADJACENT DRIVE SELECTOR PUSHBUTTON WILL NOT RESULT IN DRIVING ANY OF THE SRM'S OR IRM'S. ADDITIONAL ACTUATION OF A DRIVE COMMAND SWITCH WILL BE REQUIRED TO RESULT IN AN ACTION.

APPENDIX D
I. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
I.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
296	TURBINE SPEED INDICATORS DO NOT FOLLOW CONVENTIONAL PATTERN.	B2.6	6.5.2.1, SEE COMMENTS	305S	9-3 & 9-4	DESIGN MOD.	II	FIX	1ST REFUELING	REVIEW THE DESIGN OF THE SPEED INDICATORS AND REPLACE SCALE OR METER
23	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2	6.5.1.6, 6.5.2.3, 6.6.6 *	23S	9-4	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
58	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	58S	9-4	ENHANC.	B	FIX	1ST REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
78	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	78S	9-4	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 265S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
106	HANDLES NEAR EDGES NOT PROTECTED WITH GUARDS TO PREVENT INADVERTENT OPERATION.	B5.4, B6.2	6.4.1.2 (SEE MISC/COMMENTS)	106S	9-4	DESIGN MOD.	FIX	FIX	1ST REFUELING	EQUIP WITH A RAIL.
114	SWITCHES FOR EMERGENCY OR ABNORMAL USE NOT CONSISTENLY MARKED.	B6.1&B 6.2	6.8.1.3, SEE COMMENTS	114S	9-4	ENHANC.	A	NO ACTION. CORRECTION MADE	MAY 85	CORRECTION IS MADE IN ACCORDANCE WITH CNS HF STANDARDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
122	DISPLAYS REFLECTING ONLY DEMAND SIGNAL NOT LABELED ACCORDINGLY.	S01.3	6.5.1.1, 6.6.3.1	122S	9-4	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELS WHERE REQUIRED IN ACCORDANCE WITH SPECIFIC STATION STANDARDS FOR LABELING. ENSURE PROPER OPERATOR TRAINING AND UPDATE OF MANUALS AND PROCEDURES WHERE APPLICABLE.
290	SUBGROUPS WITHIN SYSTEM ARE NOT PROPERLY LAID-OUT SO THAT FLOW PATHS CAN BE EASILY CONSTRUCTED.	A2.4,A 2.7	6.6.6.4, 6.8.2.2 SEE COMMENTS	24SS	9-4	ENHANC.	B	FIX	1ST REFUELING	RELOCATE SWITCHES SO THAT FLOW PATH CAN BE LAID-OUT IN ACCORDANCE WITH CNS-HF STANDARDS
291	CONTROLS & DISPLAYS NOT GROUPED IN FUNCTIONAL OR SEQUENTIAL RELATIONSHIP.	A3.3	6.8.2.1, 6.9.2.1, SEE COMMENTS	25SS	9-4	ENHANC	B	FIX	1ST REFUELING	INTEGRATE WITH HED 24SS
292	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	C2.8	6.3.1.4 (SEE MISC/COMMENTS)	26SS	9-4	ENHANC.	A	FIX	1ST REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
293	CONTROLS LOCATED OUTSIDE RECOMMENDED ZONES.	A1.1, A3.6	6.1.2	27SS	9-4	DESIGN MOD.	II	FIX	1ST REFUELING	INTEGRATE WITH HED 38SS. RELOCATE CONTROL AND ASSOCIATED ALARM IN RADWASTE SUBSECTION OF THE PANEL IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
294	LABELS AND LEGEND PLATES, NOT UNIFORMLY POSITIONED FOR FUNCTIONAL CLARITY.	A5.11	6.6.2.1, SEE COMMENTS	28SS	9-4	DESIGN MOD	III	FIX	1ST REFUELING	SWAP COMPUTER TREND RECORDER WITH RR & FW TEMPERATURE RECORDER. THIS WILL PLACE THE COMPUTER TREND RECORDER IMMEDIATELY TO THE RIGHT OF THE LEGEND PLATE.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
295	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	29SS	9-4	ENHANC.	A	FIX	1ST REFUELING	REPLACE SCALES PER CNS STANDARDS
297	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OF FUNCTION.	B5.10	6.4.2.2 (SEE COMMENTS)	31SS	9-4	ENHANC.	A	FIX	1ST REFUELING	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
298	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4	32SS	9-4	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STANDARDS, THAT INCLUDE LABELING AND LIST OF STANDARD ABBREVIATIONS.
299	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	B2.13	6.5.1.5	33SS	9-4	ENHANC	B	FIX	1ST REFUELING	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
300	PROCESS UNITS INFORMATION NOT EASILY READ	B2.4, SB2.1	6.5.4.1, 6.5.4.2, (SEE COMMENTS)	34SS	9-4	ENHANCEMENT	A	FIX	1ST REFUELING	EXAMINE RECORDER AND DETERMINE COMPLIANCE OF RECORDER DISPLAYED INFORMATION WITH CNS HF STANDARDS AND NUREG 0700. PROCESS UNITS MAY BE PLACED ON FACE OF RECORDER.
301	POINTER COVERS RECORDER SCALE MARKING	B3.1	6.5.2.2, 6.5.4.1, SEE COMMENTS	35SS	9-4	ENHANC	A	FIX	1ST REFUELING	REPLACE POINTER OR RAISE SCALE
302	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.	C2.7	6.3.3.4, SEE COMMENTS	36SS	9-4		II		1ST REFUELING	SUBJECT TO DCRDR ASSESSMENTS.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
303	COMBINED LINEAR AND NONLINEAR SCALES ARE USED ON THE SAME RECORDER.	SB1.2	6.5.1.5, SEE COMMENTS	375S	9-4	ENHANC	B	FIX	1ST REFUELING	REVIEW DESIGN OF THE RECORDER SCALE AND REPLACE THE LINEAR OR NONLINEAR SCALE TO MAKE THEM IDENTICAL.
304	ANNUNCIATORS NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEM.	C1.1	6.3.3.3 (SEE MISC/COMMENTS)	385S	9-4	DESIGN MOD.	II	FIX	1ST REFUELING	INTEGRATE WITH HED 275S IN RELOCATING ALARM AND ALARM BYPASS SELECTOR SWITCH TO THE RW SUBSECTION OF THE PANEL.
305	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	A3.7, SA3	6.4.2.2, 6.5.1.6, 6.6.6.4	395S	9-4	DESIGN MOD.	II	FIX	1ST REFUELING	INTEGRATE WITH HED 245S & 255S FOR POSSIBILITY OF RELOCATING INDICATIONS TO PROVIDE NECESSARY DEMARTICATION OF SUBGROUPS.
455	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE SIZE	C2.2	6.3.3.4, 6.3.3.5, SEE COMMENTS	1905S	9-4	ENHANC.	A	FIX	MAY'85	THE ANNUNCIATOR TILE IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.
59	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	59S	9-5	ENHANC.	B	FIX	1ST REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
79	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	79S	9-5	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 59S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
123	DISPLAYS REFLECTING ONLY DEMAND SIGNAL NOT LABELED ACCORDINGLY.	SB1.3	6.5.1.1, 6.6.3.1	123S	9-5	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELS WHERE REQUIRED IN ACCORDANCE WITH SPECIFIC STATION STANDARDS FOR LABELING. ENSURE PROPER OPERATOR TRAINING AND UPDATE OF MANUALS AND PROCEDURES WHERE APPLICABLE.

APPENDIX D
6. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
135	ANNUNCIATORS NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEM.	C1.1	6.3.3.3 (SEE MISC/COMMENTS)	135S	9-5	OTHER MOD.	III	NO ACTION	1ST REFUELING	A MINOR DISCREPANCY. ALARM BOXES ARE ADJACENT.
137	WARNING AND DIAGNOSTIC ALARMS NOT SEGREGATED FROM INFORMATION AND ADVISORY ALARMS.	C1.3	6.3.3.3	137S	9-5	OTHER MOD.	III	NO ACTION	1ST REFUELING	DISCREPANCY COULD NOT BE VERIFIED. THE INFORMATION ALARMS ON THIS PANEL ARE ALSO CONSIDERED WARNING AND DIAGNOSTIC ALARMS.
140	ANNUNCIATOR LEGEND TILE TERMINOLOGY IS NOT CONSISTENT WITH THE INPUT SIGNAL FUNCTION.	C2.5	6.3.3.4 (SEE MISC/COMMENTS)	140S	9-5	ENHANC.	B	FIX	1ST REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES AND ENSURE CONFORMANCE WITH SYSTEM DESIGNATION & CONTROLS LABELING.
284	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	A5.4	6.6.1.1, 6.6.3.1	17SS	9-5	ENHANC.	A	FIX	1ST REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES PANEL FUNCTION. NEW LABELING SHOULD MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
306	CONTROLS & DISPLAYS NOT GROUPED IN FUNCTIONAL OR SEQUENTIAL RELATIONSHIP.	A3.1, A3.3	6.8.2.1, 6.9.2.1, SEE COMMENTS	40SS	9-5	DESIGN MOD	II	FIX	1ST REFUELING	INTEGRATE WITH HED 42SS
307	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.1, A4.2	6.5.1.6, 6.5.2.3, 6.6.6 *	41SS	9-5	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
308	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.3, SA3	6.6.6.1, 6.6.6.2, 6.8.1.3 &	42SS	9-5	ENHANC.	A	FIX	1ST REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
309	CONTROLS LOCATED OUTSIDE RECOMMENDED ZONES.	A1.1, B1.1	6.1.2	43SS	9-5	DESIGN MOD.	II	FIX	1ST REFUELING	INTEGRATE WITH HED 40SS. RELOCATE CONTROLS AND ASSOCIATED DISPLAYS. IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
310	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	A5.10	6.6.2.1, 6.6.3.1 SEE COMMENTS	44SS	9-5	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
311	LABELS AND LEGEND PLATES, NOT CONSISTENTLY POSITIONED ABOVE OR BELOW DEVICES.	A5.11	6.6.2.1	45SS	9-5	ENHANC.	A	FIX	1ST REFUELING	PLACE LABELS ACCORDING TO CMS HF STANDARDS.
312	LABELS ARE NOT SIZE CODED IN A HIERARCHICAL SYSTEM.	A5.7	6.6.3.2, 6.6.3.3, 6.6.3.4 &	46SS	9-5	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
313	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	A5.3	6.6.1.1, 6.6.3.1, SEE COMMENTS	47SS	9-5	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS' IDENTIFICATION.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
314	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	48SS	9-5	ENHANC.	B	FIX	1ST REFUELING	REPLACE SCALES PER CNS STANDARDS.
315	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	B2.13	6.5.1.5	4SS	9-5	ENHANC	B	FIX	1ST REFUELING	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
316	PRINTED VALUES DO NOT CORRESPOND TO SCALE VALUES.	B3.2	6.5.4.1, SEE COMMENTS	49SS	9-5	ENHANC	A	FIX	1ST REFUELING	REPLACE CHART PAPER.
317	EMERGENCY SWITCHES ARE NOT PROTECTED FROM INADVERTENT OPERATION.	B6.2	6.4.1.2 (SEE MISC/COMMENTS)	50SS	9-5	OTHER MOD	III	NO ACTION	NONE	SCRAM BUTTONS SHOULD BE READILY ACCESIBLE TO THE OPERATOR. NO ACTION IS REQUIRED.
318	ANNUNCIATOR NOMENCLATURE, ACRONYMS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	C2.1	6.3.3.4 (SEE COMMENTS)	51SS	9-5	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
319	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	C2.6	6.3.1.2	52SS	9-5	OTHER MOD	III	NO ACTION	NONE	PLACEMENT OF SETPOINTS ON WINDOWS IS NOT NECESSARY. THEY ARE EASILY FOUND IN ALARM PROCEDURES LOCATED AT PANELS.
320	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.	C2.7	6.3.3.4, SEE COMMENTS	53SS	9-5	DESIGN MOD.	II	FIX	1ST REFUELING	IDENTIFY THOSE MULTIPLE-CHOICE INDICATION ALARMS THAT ARE CRITICAL TO SAFETY. WHERE VISUAL INDICATORS NOT AVAILABLE ON THE PANEL TO VERIFY THE HIGH OR LOW INPUTS, ALARMS WILL BE SEPARATED TO SINGLE-CHOICE INDICATIONS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
321	REACTOR MODE SWITCH REQUIRES EXCESSIVE FORCE TO OPERATE.	B7.6	6.4.4.	545S	9-5	DESIGN MOD	II	FIX	2ND REFUELING	REVIEW SWITCH DESIGN RELATIVE TO SWITCH DESIGN SPEC. PERFORM NECESSARY DESIGN MODIFICATIONS IN TERMS OF REPLACING SWITCH HANDLE OR SWITCH TYPE.
322	INDICATOR INFORMATION NOT EASILY READ.	B2.4	6.5.1.1, 6.5.2.2, SEE COMMENTS	555S	9-5	ENHANC.	A	FIX	1ST REFUELING	EXAMINE INDICATORS AND DETERMINE COMPLIANCE OF INDICATOR DISPLAYED INFORMATION WITH CNS HF STANDARDS AND NUREG 0700.
323	POINTER COVERS RECORDER SCALE MARKING.	B3.1	6.5.2.2, 6.5.4.1, SEE COMMENTS	565S	9-5	ENHANC	A	FIX	1ST REFUELING	REPLACE POINTER OR RAISE SCALE.
389	INDICATOR DESIGN DOES NOT FOLLOW CONVENTIONAL PATTERN.	B2.6, B2.7	INDIC.PO INTER MOVEMENT ON SCALE	1215S	9-5	OTHER MOD.	III	NO ACTION	NONE	NO ACTION IS REQUIRED. INDICATOR DESIGN IS A STANDARD METER FOR SRM PERIOD.
21	NO PLANT STANDARD EXISTS FOR COLOR CODING.	A4.1	6.5.1.6 *	21S	ALL PANELS	ENHANC.	B	FIX	1ST REFUELING	DEVELOP CONTROL ROOM COLOR CODING AS A PART OF CNS HUMAN FACTOR ENGINEERING STANDARDS.
98	NO POSITIVE MEANS OF DIAGNOSING FAILED INDICATING LIGHTS AVAILABLE.	B4.4	6.4.3.3, 6.5.3.1 *	98S	ALL PANELS	DESIGN MOD.	III	REASSESS PER NRC REQU. 9-5-85	1ST REFUELING	EXISTING ANNUNCIATOR SYS AT CNS INCORPORATE TEST CAPABILITIES SO NO ACTION IS REQUIRED. FOR STATUS INDICATING LIGHTS REDUNDANT INDICATIONS ARE AVAILABLE TO DISTINGUISH FAILED LIGHTS. FOR PANEL 9-5, CONTROL ROD POSITIONS WILL BE IDENTIFIED ON SPDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
134	PROCEDURAL PROVISIONS TO PREVENT INTERCHANGING INDICATING LIGHT LENSES NOT AVAILABLE.	SB1	6.5.3.1 *	134S	ALL PANELS	OTHER MOD.	III	NO ACTION	NONE	NORMAL PRACTICE IS TO REPLACE LIGHT LENSES INDIVIDUALLY. REDUNDANT INDICATIONS AVAILABLE TO DISTINGUISH INTERCHANGING LENSES.
149	ALARMS NOT PROVIDED WITH ALPHANUMERIC CODE FOR PROMPT RESPONSE.	C2.9	6.3.3.3 *	149S	ALL PANELS	ENHANC.	B	FIX	1ST REFUELING	ENGRAVE THE ALARM TILES BY NUMERIC/NUMERIC CODE. THIS WILL MAINTAIN THE EXISTING ALARM IDENTIFICATION KNOWN TO THE OPERATOR.
155	ALARMS DO NOT REFLASH FOR SECOND ALARM INPUT.	C6.3	6.3.1.2 *	155S	ALL PANELS	DESIGN MOD.	II	FIX	2ND REFUELING	THE EXISTING ANNUNCIATOR SYSTEMS WILL BE MODEIFIED TO PROVIDE AUDITORY ALERT AND REFLASH CAPABILITIES.
156	NO STANDARD GUIDE FOR WRITING ANNUNCIATOR PROCEDURES IS IN USE.	C7.1	6.3.4.7 *	156S	ALL PANELS	ENHANC.	B	FIX	1ST REFUELING	PROVIDE A STANDARD FOR WRITING ANNUNCIATOR PROCEDURES.
158	HIGHLY DENSE ANNUNCIATOR MATRICES.	SC1	6.3.3.3 *	158S	ALL PANELS	OTHER MOD.	III	NO ACTION	NONE	NOT A SERIOUS PROBLEM. THE MAXIMUM NUMBER OF TILES (PWR 9-5) IS 54, CLOSE TO 50 RECOMMENDED IN NUREG 0700.
289	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.	C5.5	6.3.4.2 *	235S	ALL PANELS	DESIGN MOD.	II	FIX	2ND REFUELING	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB's ON TOP ROW, AND "TEST" ON BOTTOM RAW. SEE CNS HF STANDARDS.
13	CONTROLS OF SIMILAR FUNCTIONS NOT GROUPED IN CONSISTENT ORDER.	A3.2	6.9.2	13S	FIRE PANEL	DESIGN MOD.	II	FIX	2ND REFUELING	TO BE COORDINATED WITH OTHER FB MODIFICATIONS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
56	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	SA1	6.5.2.2, 6.5.1.6, 6.6.6.4	51S	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 2795S TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
159	HIGHLY DENSE ANNUNCIATOR MATRICES WITHIN PANEL.	SC1	6.3.3.3, (SEE COMMENTS)	159S	FIRE PANEL	OTHER MOD.	III	NO ACTION	NONE	NOT A SERIOUS PROBLEM. THE MAXIMUM NUMBER OF TILES IS 36, LESS THAN 50, RECOMMENDED IN NUREG 0700.
517	ANNUNCIATOR RESPONSE CONTROLS NOT CODED FOR EASE OF RECOGNITION.	SC2	6.3.4.2, SEE COMMENTS	243SS	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 247SS. ENCLOSE THE CONTROLS WITH DEMARCATION LINES IN ACCORDANCE WITH CNS HF STANDARDS.
518	UNIDENTIFIABLE PROCESS UNITS.	SB1.4	6.5.1.4	244SS	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	IDENTIFY PROCESS UNITS ON FACE OF RECORDER.
519	SEVERAL NUISANCE ALARMS ARE PRESENT DURING OPERATING STATE.	C9	6.3.1.2, SEE COMMENTS	245SS	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	REVIEW THE FREQUENCY OF THESE NUISANCE ALARMS, THEIR SETPOINTS RELATIVE TO THE EQUIPMENT LIMITING VALUES.
520	NO STANDARD GUIDE FOR WRITING ANNUNCIATOR PROCEDURES IS IN USE.	C7.1	6.3.4.3 (SEE COMMENTS)	246SS	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	PROVIDE A STANDARD FOR WRITING ANNUNCIATOR PROCEDURES.
521	ANNUNCIATOR RESPONSE BUTTONS AND DEMARCATION OF CONTROLS ARE INCONSISTENT WITH OTHER PANELS.	C5.5, SC2	6.3.4.2, SEE COMMENTS	247SS	FIRE PANEL	DESIGN MOD.	II	FIX	2ND REFUELING	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB'S ON TOP ROW, AND "TEST" ON BOTTOM ROW. SEE CNS HF STANDARDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
522	ANNUNCIATOR LEGEND TILE TERMINOLOGY IS NOT CONSISTENT WITH THE INPUT SIGNAL FUNCTION.	C2.5	6.3.3.4 (SEE MISC/COMMENTS)	248SS	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES AND ENSURE CONFORMANCE WITH SYSTEM DESIGNATION & CONTROLS LABELING.
523	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	C2.6	6.3.1.2	249SS	FIRE PANEL	OTHER MOD	III	NO ACTION	NONE	PLACEMENT OF SETPOINTS ON WINDOWS IS NOT NECESSARY. THEY ARE EASILY FOUND IN ALARM PROCEDURES LOCATED AT PANELS.
524	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	C2.6	6.3.1.2, SEE COMMENTS	250SS	FIRE PANEL	OTHER MOD	III	NO ACTION	NONE	ALARM SETPOINTS ARE IDENTIFIED ON ALARM PROCEDURES, LOCATED ON PANELS.
525	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES	C2.7	6.3.3.4, SEE COMMENTS	251SS	FIRE PANEL	DESIGN MOD.	II	FIX	2ND REFUELING	IDENTIFY THOSE MULTIPLE-CHOICE INDICATION ALARMS THAT ARE CRITICAL TO SAFETY. WHERE VISUAL INDICATORS NOT AVAILABLE ON THE PANEL TO VERIFY THE HIGH OR LOW INPUTS, ALARMS WILL BE SEPARATED TO SINGLE-CHOICE INDICATIONS.
526	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE SIZE.	C2.2	6.3.3.4, 6.3.3.5, SEE COMMENTS	252SS	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	THE ANNUNCIATOR TILES IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.
527	ANNUNCIATOR NOMENCLATURE, ACRONYMS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	C2.1	6.3.3.4 (SEE COMMENTS)	253SS	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
529	LABELS AND INDICATING LIGHTS ARE VISUALLY OBSTRUCTED BY HAND DURING SWITCH MOVEMENT	B5.8	6.6.2.4, SEE COMMENTS	258SS	FIRE PANEL	DESIGN MOD	II	FIX	2ND REFUELING	REVIEW POSITION OF LABELS AND ILS RELATIVE TO ASSOCIATED CONTROLS AND MAKE THE NECESSARY CORRECTIONS PER NUREG-0700 GUIDELINES.
533	INCONSISTENCY IN INSERTION OF KEYS IN KEY-OPERATED SWITCHES.	B5.1	6.4.1.1 a	259SS	FIRE PANEL	DESIGN MOD.	III	NO ACTION	NONE	HED IS NOT OF SAFETY SIGNIFICANCE. DIRECTION OF KEY INSERTION IS APPARENT THROUGH SWITCH DESIGN.
535	NO POSITIVE MEANS OF DIAGNOSING FAILED INDICATING LIGHTS AVAILABLE.	B4.4	6.4.3.3, 6.5.3.1, (SEE COMMENTS)	261SS	FIRE PANEL	DESIGN MOD.	III	REASSESS PER NRC REQU. 9-5-85	2ND REFUELING	EXISTING ANNUNCIATOR SYS AT CNS INCORPORATE TEST CAPABILITIES SO NO ACTION IS REQUIRED. FOR STATUS INDICATING LIGHTS REDUNDANT INDICATIONS ARE AVAILABLE TO DISTINGUISH FAILED LIGHTS. FOR PANEL 9-5, CONTROL ROD POSITIONS WILL BE IDENTIFIED ON SPDS.
537	FAILURE MODE OF INSTRUMENTS NOT EVIDENT.	B2.17	6.5.1.1	263SS	FIRE PANEL	OTHER MOD.	III	NO ACTION	NONE	INDICATORS BASICALLY FAIL DOWNSCALE. CORRELATION WITH OTHER INDICATIONS VERIFY INSTRUMENT FAILURE.
538	HIGH INDICATORS ON THE PANEL EXPERIENCE GLARE & REFLECTION.	B2.2, S81.1	6.1.2.2	264SS	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
540	ANNUNCIATOR PANELS CAN BE SEEN BUT NOT READ FROM POSITIONS OTHER THAN DIRECTLY IN FRONT OF PANELS.	A7.3	6.3.3.1, 6.3.3.5, SEE COMMENTS	266SS	FIRE PANEL	OTHER MOD.	III	NO ACTION	NONE	OPERATOR HAS TO WALK TO PANEL TO SILENCE ALARM, WHERE HE CAN READ ANNUNCIATOR TILE. THIS HED IS NOT IN VIOLATION WITH NUREG 0700.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
541	TEMPORARY LABELS ARE USED FOR POWER SUPPLY IDENTIFICATION AND ON ALARM TILES.	A6.1	6.6.5.1, SEE COMMENTS	2675S	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
542	LABELS AND LEGEND PLATES, NOT UNIFORMLY POSITIONED FOR FUNCTIONAL CLARITY.	A5.11	6.6.2.1, SEE COMMENTS	2685S	FIRE PANEL	DESIGN MOD	III	FIX	2ND REFUELING	SWAP COMPUTER TREND RECORDER WITH RR & FW TEMPERATURE RECORDER. THIS WILL PLACE THE COMPUTER TREND RECORDER IMMEDIATELY TO THE RIGHT OF THE LEGEND PLATE.
543	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	A5.10	6.6.2.1, 6.6.3.1 SEE COMMENTS	2695S	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
545	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	A5.4	6.6.1.1, 6.6.3.1	2715S	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
546	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	A5.3	6.6.1.1, 6.6.3.1, SEE COMMENTS	2725S	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.
547	LACK OF COMPONENT IDENTIFICATION LABELS	A5.1	LABELING INFORMATION	2735S	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS THAT DESCRIBES THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
548	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2	6.5.1.6, 6.5.2.1, 6.6.6 *	274SS	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
549	NO PLANT STANDARD EXISTS FOR COLOR CODING	A4.1	6.5.1.6 (SEE COMMENTS)	275SS	FIRE PANEL	ENHANC.	B	FIX	1ST REFUELING	DEVELOP CONTROL ROOM COLOR CODING AS A PART OF CNS HUMAN FACTOR ENGINEERING STANDARDS.
551	STRINGS AND MATRICES OF COMPONENTS OF SIMILAR FUNCTIONS NOT DIFFERENTIATED BY DEMARCATION OR HEIRARCHICAL LABELING.	A3.4, A5.7	6.6.1.2, 6.6.6.2, SEE COMMENTS	277SS	FIRE PANEL	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 279SS AND 276SS. NEW LABELING SHOULD BE MERGED WITH EXISTING LABELS IN HIERARCHICAL FORM.
553	CONTROL AND DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	A1.1, A3.6	6.1.2	279SS	FIRE PANEL	DESIGN MOD	II	FIX	2ND REFUELING	INTEGRATE WITH THE DESIGN MODIFICATION PLANNED FOR THIS PANEL. RELOCATE IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
19	MIMIC HAS NO ARROWS NOTING DIRECTION OF FLOW.	A2.9	6.6.6.4, SEE COMMENTS	19S	VBD-A	ENHANC.	A	FIX	3RD REFUELING	MODIFICATION BY ENHANCEMENT TECHNIQUES IN AGREEMENT WITH SPECIFIC STATION STANDARDS AND NUREG 0700 GUIDELINES.
40	TEMPORARY LABELS NOT CONSISTENT IN FORMAT, COLOR OR USE.	A6.3		40S	VBD-A	ENHANC.	B	FIX	3RD REFUELING	REMOVE TEMPORARY LABELS OR MAKE THEM CONSISTENT.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
45	ANNUCIATOR PANELS CAN BE SEEN BUT NOT READ FROM POSITIONS OTHER THAN DIRECTLY IN FRONT OF PANELS.	A7.3	6.3.3.1, 6.3.3.5, SEE COMMENTS	45S	VBD-A	OTHER MOD.	III	NO ACTION	NONE	OPERATOR HAS TO WALK TO PANEL TO SILENCE ALARM, WHERE HE CAN READ ANNUNCIATOR TILE. THIS HED IS NOT IN VIOLATION WITH NUREG 0700.
80	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	80S	VBD-A	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 68S5, 89S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
89	RECORDER SCALES NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3 (SEE MISC/COMMENTS)	89S	VBD-A	ENHANC.	B	FIX	3RD REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOP'S ON RECORDER SCALES.
108	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OF FUNCTION.	B5.10	6.4.2.2 (SEE COMMENTS)	108S	VBD-A	ENHANC.	B	FIX	3RD REFUELING	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
115	SWITCHES FOR EMERGENCY OR ABNORMAL USE NOT CONSISTENTLY MARKED.	B6.1&B 6.3	6.8.1.3, SEE COMMENTS	115S	VBD-A	ENHANC.	A	NONE, CORRECTION MADE*	MAY'85.	*CORRECTION HAD BEEN MADE IN ACCORDANCE WITH CNS HF STANDARDS.
124	DISPLAYS REFLECTING ONLY DEMAND SIGNAL NOT LABELED ACCORDINGLY.	SB1.3	6.5.1.1, 6.6.3.1	124S	VBD-A	ENHANC.	A	FIX	3RD REFUELING	FABRICATE NEW LABELS WHERE REQUIRED IN ACCORDANCE WITH SPECIFIC STATION STANDARDS FOR LABELING. ENSURE PROPER OPERATOR TRAINING AND UPDATE OF MANUALS AND PROCEDURES WHERE APPLICABLE.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
133	MULTI-CHANNEL RECORDER DOES NOT DISPLAY CHANNEL BEING PLOTTED. INFORMATION IS NOT EASILY EXTRACTED.	SB2.2	6.5.4.2	133S	VBD-A	DESIGN MOD.	II	NONE, CORRECTION MADE*	MAY '85	*DISCREPANCY HAS BEEN CORRECTED THROUGH REPLACEMENT OF RECORDER.
142	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	C2.8	6.3.1.4 (SEE MISC/COM MENTS)	142S	VBD-A	ENHANC.	B	FIX	3RD REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
324	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COM MENTS)	5SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	REPLACE SCALES PER CNS STANDARDS.
325	LABELS NOT CONSISTENTLY POSITIONED ABOVE OR BELOW DEVICES.	A5.11	6.6.2.1, SEE COMMENTS	20SS	VBD-A	ENHANC.	A	FIX	3RD REFUELING	RELOCATE EXISTING LABELS IN COMPLIANCE WITH SPECIFIC STATION STANDARDS.
326	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.2, SA3	6.6.6.1, 6.6.6.2, 6.B.1.3 *	57SS	VBD-A	ENHANC.	A	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
327	SUBGROUPS WITHIN SYSTEM ARE NOT PROPERLY LAID-OUT SO THAT FLOW PATHS CAN BE EASILY CONSTRUCTED.	A2.7, A3.1	6.6.6.4, 6.B.2.2, SEE COMMENTS	58SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	RELOCATE SWITCHES OR IMPROVE EXISTING DEMARCATION SO THAT FLOW PATH CAN BE LAID-OUT IN ACCORDANCE WITH CNS HF STANDARDS
328	CONTROLS LOCATED OUTSIDE RECOMMENDED ZONES	A1.1, A3.6	6.1.2	59SS	VBD-A	DESIGN MOD.	II	FIX	3RD REFUELING	INTEGRATE WITH HED . RELOCATE CONTROLS IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
329	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2	6.5.1.6, 6.5.2.3, 6.6.6 *	60SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
330	POSSIBLE DUAL MEANING FOR COLOR OF INDICATING LIGHTS.	A4.3	6.5.3.2, SEE COMMENTS	61SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	REPLACE COLOR OF INDICATING LIGHTS IN ACCORDANCE WITH CNS HF STANDARDS.
331	SWITCH HANDLES OBSCURE SWITCH POSITIONS.	B5.11	6.6.3.8, SEE COMMENTS	62SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	REPLACE SWITCH HANDLES. ENSURE CONFORMANCE WITH CNS HUMAN FACTOR STANDARDS.
332	LACK OF COMPONENT IDENTIFICATION LABEL.	A5.1	LABELING INFORMAT ION	63SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELS THAT DESCRIBE THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.
333	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	A5.5, A5.10	6.6.3.2, 6.6.3.3, 6.6.3.4 *	64SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
334	EXTENSIVE TEMPORARY LABELS ARE BEING USED.	A6.1	6.6.5.1, SEE COMMENTS	66SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
335	TEMPORARY CHANGES OR MODIFICATIONS ARE NOT CONTROLLED IN APPLICATION OR INCOPRORATED IN ADMINISTRATIVE PROCEDURES.	A6.2, A6.5	6.6.5.2	67SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	DEVELOP AN ADMINISTRATIVE PROCEDURE THAT ADDRESS THE NEED FOR TEMPORARIES, AND HOW AND WHERE THEY WILL BE USED.
336	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATIONS.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	68SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
337	HIGH INDICATORS ON THE PANEL EXPERIENCE GLARE & REFLECTION.	B2.2, SB1.1	6.1.2.2	69SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF USING NON-GLARE GLASS, TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
338	FAILURE MODE OF INSTRUMENTS NOT EVIDENT.	B2.17	6.5.1.1	70SS	VBD-A	OTHER MOD.	III	NO ACTION	NONE	INDICATORS BASICALLY FAIL DOWNSCALE. CORRELATION WITH OTHER INDICATIONS VERIFY INSTRUMENT FAILURE.
339	HIGH RECORDERS ON PANEL EXPERIENCE SOME GLARE AND REFLECTIONS.	B3.14	6.1.2.2	71SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF USING NON-GLARE GLASS OR TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
340	INADEQUATE HAND SPACE BETWEEN CONTROLS.	B5.9	6.8.3.1, SEE COMMENTS	73SS	VBD-A	DESIGN MOD	II	FIX	3RD REFUELING	REVIEW CONTROL DESIGN RELATIVE TO NUREG 0700 GUIDELINES AND MAKE THE NECESSARY CORRECTIONS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
341	ANNUNCIATORS NOT GROUPED ABOVE RELATED CONTROLS AND DISPLAYS.	C1.2	6.3.3.1, SEE COMMENTS	74SS	VBD-A	OTHER MOD	III	NO ACTION	NONE	ANNUNCIATOR ARE ADJACENT TO RELATED CONTROLS AND DISPLAYS. THEY ARE LOCATED ON THE SAME PANEL.
342	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	C2.6	6.3.1.2, SEE COMMENTS	75SS	VBD-A	OTHER MOD	III	NO ACTION	NONE	ALARM SETPOINTS ARE IDENTIFIED ON ALARM PROCEDURES, LOCATED ON PANELS.
343	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	B2.13	6.5.1.5	76SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
344	SWITCH DESIGN DOES NOT FOLLOW CONVENTIONAL PATTERN.	B5.1	6.4.1.1, 6.4.2.1, SEE COMMENTS	77SS	VBD-A	DESIGN MOD.	II	FIX	3RD REFUELING	PERFORM THE NECESSARY DESIGN MODIFICATION TO ENSURE SWITCH MOVEMENT FOLLOWS CONVENTIONAL PATTERN. RELABEL SWITCH POSITION ACCORDINGLY.
345	SEVERAL NUISANCE ALARMS ARE PRESENT DURING OPERATING STATE.	C9	6.3.1.2, SEE COMMENTS	78SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	REVIEW THE FREQUENCY OF THESE NUISANCE ALARMS, THEIR SETPOINTS RELATIVE TO THE EQUIPMENT LIMITING VALUES.
396	EMERGENCY SWITCHES ARE NOT PROTECTED FROM INADVERTENT OPERATION.	B6.2	6.4.1.2 (SEE MISC/COM MENTS)	130SS	VBD-A	OTHER MOD	III	NO ACTION	NONE	SWITCHES ARE RECESSED, UNLIKELY TO MOVE THEM ACCIDENTALLY. PROTECTIVE COVERS NOT REQUIRED AS SWITCHES SHOULD BE READILY ACCESSIBLE TO THE OPERATOR. NO ACTION IS REQUIRED.
469	UNIDENTIFIABLE PROCESS UNITS	B2.3	6.5.1.4	350SS	VBD-A	ENHANC.	B	FIX	3RD REFUELING	IDENTIFY PROCESS UNITS ON FACE OF RECORDER.
12	AIR EJECTOR AIR CONTROL VALVES ARE MIRROR IMAGED.	A2.8 & A3.1	6.8.3.3, SEE COMMENTS	12S	VBD-B	DESIGN MOD.	II	FIX	3RD REFUELING	THE AIR EJECTOR CONTROLS SHOULD BE REARRANGED SO THAT MIRROR IMAGING NO LONGER EXISTS. ENSURE APPROPRIATE DRAWINGS ARE UPDATED AND OPERATIONS DEPARTMENT IS AWARE OF THE CHANGE.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
37	LABELS AND ESCUTCHEONS NOT SIZE CODED IN A HIERARCHICAL SYSTEM	A5.7	6.6.3.2, 6.6.3.3, 6.6.3.4*	37S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
46	ANNUCIATOR PANELS CAN BE SEEN BUT NOT READ FROM POSITIONS OTHER THAN DIRECTLY IN FRONT OF PANELS.	A7.3	6.3.3.1, 6.3.3.5, SEE COMMENTS	46S	VBD-B	OTHER MOD.	III	NO ACTION	NONE	OPERATOR HAS TO WALK TO PANEL TO SILENCE ALARM, WHERE HE CAN READ ANNUNICATOR TILE. THIS HED IS NOT IN VIOLATION WITH NUREG 0700.
49	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	SA3	6.4.2.2, 6.5.1.6, 6.6.6.4 *	49S	VBD-B	ENHANC.	B		3RD REFUELING	INTEGRATE WITH HED 10655 TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
74	RECORDER PRINTED VALUES NOT EASILY READ	B3.1	6.5.4.1, 6.5.4.2, SEE COMMENTS	74S	VBD-B	DESIGN MOD.	II	NO ACTION REQUIRED*	3RD REFUELING	*DISCREPANCY HAS BEEN CORRECTED. RECORDERS WERE REPLACED.
81	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	81S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 11355. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
90	RECORDER SCALES NOT MARKET TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3 (SEE MISC/COMMENTS)	90S	VBD-B	ENHANC.	A	FIX	3RD REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOP'S OR RECORDER SCALES.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
141	ANNUNCIATOR LEGEND TILE TERMINOLOGY IS NOT CONSISTENT WITH THE INPUT SIGNAL FUNCTION.	C2.5	6.3.3.4 (SEE MISC/COMMENTS)	141S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES AND ENSURE CONFORMANCE WITH SYSTEM DESIGNATION & CONTROLS LABELING.
143	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	C2.8	6.3.1.4 (SEE MISC/COMMENTS)	143S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
372	RELATED SUBGROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.3	6.6.6.1, 6.6.6.2, 6.8.1.3 a	106SS	VBD-B	ENHANC.	A	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
373	MIMICS NEED IMPROVEMENT SO FLOW PATHS & ARRANGEMENTS ARE ORDERLY & EASILY RECOGNIZED.	A2.7	6.6.6.4, 6.8.2.2 SEE COMMENTS	107SS	VBD-B	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 106SS. RELOCATE SWITCHES SO THAT FLOW PATH CAN BE LAID-OUT IN ACCORDANCE WITH CNS-HF STANDARDS.
374	CONTROL AND DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	A1.1, A3.6	6.1.2	108SS	VBD-B	DESIGN MOD.	II	FIX	3RD REFUELING	REVIEW THE NEED FOR MOVING DISPLAYS AND CONTROLS. RELOCATE IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
375	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4 a	109SS	VBD-B	ENHANC.	A	FIX	3RD REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
376	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2, A4.3	6.5.1.6, 6.5.2.3, 6.6.6 *	110SS	VBD-B	ENHANC.	A	FIX	3RD REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
377	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION AND FUNCTION.	A5.3, A5.4	LABELING INFORMAT ION	111SS	VBD-B	ENHANC.	A	FIX	3RD REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.
378	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	A5.6	6.6.4.1, SEE COMMENTS	112SS	VBD-B	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
379	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COM MENTS)	113SS	VBD-B	ENHANC.	B	FIX	3RD REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
380	LABELS NOT CONSISTENTLY POSITIONED ABOVE OR BELOW LABELS.	A5.11	6.6.2.1, SEE COMMENTS	114SS	VBD-B	ENHANC.	B	FIX	3RD REFUELING	RELOCATE EXISTING LABELS IN COMPLIANCE WITH SPECIFIC STATION STANDARDS.
381	SEVERAL TEMPORARY LABELS ARE NOT ORIENTED HORIZONTALLY.	A5.14	6.6.2.3, SEE COMMENTS	115SS	VBD-B	ENHANC.	B	FIX	3RD REFUELING	REVIEW THE NEED FOR THE TEMPORARY LABELS. IF NEEDED, REPLACE WITH LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
382	TEMPORARY LABELS ARE NOT MINIMIZED.	A6.1, A6.2	6.6.5.1, SEE COMMENTS	116SS	VBD-B	ENHANC.	B	FIX	3RD REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
383	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	B2.13	6.5.1.5	1175S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
384	TEMPORARY LABELS NOT CONSISTENT AND CONTROLLED IN NOMENCLATURE, FONT AND COLOR.	A6.3	6.6.5.1, SEE COMMENTS	1185S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 1155S AND 1165S FOR REPLACING WITH PERMANENT LABELS, AND ENHANCING THOSE NOT REPLACED IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
385	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	1195S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	REPLACE SCALES PER CNS STANDARDS.
386	TEMPORARY LABELS NOT REVIEWED PERIODICALLY, MADE PERMANENT OR REMOVED.	A6.7	6.6.5.2	1205S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 1165S IN REPLACING TEMPORARIES WITH PERMANENT LABELS.
387	SEVERAL INDICATORS EXPERIENCE GLARE AND PARALLAX WHEN STATIONED AT THE PANEL.	B2.2,B 3.14	6.1.2.2	1215S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
388	UNIDENTIFIABLE PROCESS UNITS.	SB1.4	6.5.1.4	1225S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	IDENTIFY PROCESS UNITS ON FACE OF RECORDER.
390	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OR FUNCTION.	B5.10	6.4.2.2 (SEE COMMENT)	1245S	VBD-B	ENHANC.	B	FIX	3RD REFUELING	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
391	SWITCHES FOR EMERGENCY OR ABNORMAL USE NOT CONSISTENTLY MARKED.	B6.1, B6.2	6.8.1.3, SEE COMMENTS	125SS	VBD-B	ENHANC.	B	FIX	3RD REFUELING	CORRECTION IS TO BE MADE IN ACCORDANCE WITH CNS HF STANDARDS
392	ANNUNCIATORS NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEM.	C1.1, C1.2	6.3.3.3 (SEE MISC/COMMENTS)	126SS	VBD-B	OTHER MOD.	III	NO ACTION	N/A	A MINOR DISCREPANCY. ALARM BOXES ARE ADJACENT, AND ARE LOCATED IN THE SAME PANEL.
394	ANNUNCIATOR NOMENCLATURE, ACRONYMNS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	C2.1	6.3.3.4 (SEE COMMENTS)	128SS	VBD-B	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
395	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE STYLE AND THE APPLICATION OF TYPE SIZE.	C2.2	6.3.3.4, 6.3.3.5, SEE COMMENTS	129SS	VBD-B	ENHANC.	B	FIX	3RD REFUELING	THE ANNUNCIATOR TILE IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.
397	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	C2.6	6.3.1.2	131SS	VBD-B	OTHER MOD	III	NO ACTION	NONE	PLACEMENT OF SETPOINTS ON WINDOWS IS NOT NECESSARY. THEY ARE EASILY FOUND IN ALARM PROCEDURES LOCATED AT PANELS.
400	CHART RECORDER'S INKING SYSTEM SOMETIMES CLOGS.	B3.11	6.5.4.1, SEE COMMENTS	134SS	VBD-B	ENHANC.	B	FIX	3RD REFUELING	REPLACE THE TYPE OF INK USED IN THE CHART RECORDERS
33	EXISTING LABELS NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	A5.10	6.6.2.1, 6.6.3.1 SEE COMMENTS	33S	VBD-C	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
47	ANNUNCIATOR PANELS CAN BE SEEN BUT NOT READ FROM POSITIONS OTHER THAN DIRECTLY IN FRONT OF PANELS.	A7.3	6.3.3.5, 6.3.3.1(SEE COMMENTS)	47S	VBD-C	OTHER MOD.	III	NO ACTION	NONE	OPERATOR HAS TO WALK TO PANEL TO SILENCE ALARM, WHERE HE CAN READ ANNUNCIATOR TILE. (REFER TO COMMENTS)
91	RECORDER SCALES NOT MARKET TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3 (SEE MISC/COM MENTS)	91S	VBD-C	ENHANC.	A	FIX	3RD REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOPS OR RECORDER SCALES.
160	ANNUNCIATOR RESPONSE CONTROLS NOT CODED FOR EASE OF RECOGNITION.	SC2	6.3.4.2, SEE COMMENTS	160S	VBD-C	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 105SS. ENCLOSE THE CONTROLS WITH DEMARCATION LINES IN ACCORDANCE WITH CNS HF STANDARDS.
347	STRINGS AND MATRICES OF COMPONENTS OF SIMILAR FUNCTIONS NOT DIFFERENTIATED BY DEMARCATION OR HIERARCHICAL LABELING.	A3.4, A5.7	6.6.1.2, 6.6.6.2, SEE COMMENTS	80SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 79SS AND 84SS. NEW LABELING SHOULD BE MERGED WITH EXISTING LABELS IN HIERARCHICAL FORM.
348	DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	A1.1, A3.6	6.1.2	81SS	VBD-C	DESIGN MOD.	II	FIX	3RD REFUELING	REVIEW THE NEED FOR MOVING THE TWO SMALL LIGHTS LOCATED ABOVE THE ANTHROPOMETRIC LIMITS. RELOCATE IN ACCORDANCE WITH NUREG 0700.
349	A WRITTEN STANDARD DOES NOT EXIST FOR COLOR USE.	A4.1	6.5.1.6 (SEE COMMENTS)	83SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	DEVELOP CONTROL ROOM COLOR CODING AS A PART OF CNS HUMAN FACTOR ENGINEERING STANDARDS.
350	MIMICS NOT INTEGRATING SYSTEM COMPONENTS.	A2.11	6.6.6.4, 6.8.2.2 SEE COMMENTS	84SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
351	NO ADDITIONAL INDICATION FOR VISUAL DISTINCTION OF DUAL MEANINGS FOR COLORS.	A4.3	6.5.3.2	85SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
352	LACK OF LABELS FOR IDENTIFYING COMPONENTS FUNCTION.	A5.1	6.6.1.1, 6.6.3.1	86SS	VBD-C	ENHANC.	A	FIX	3RD REFUELING	FABRICATE NEW LABELS THAT DESCRIBE THE FUNCTION OF EQUIPMENT ITEMS AND COMPONENT ID'S.
353	COLOR USE REQUIRES IDENTIFICATION OF OPERATIONAL LIMITS OR WARNINGS.	A5.2		87SS	VBD-C				3RD REFUELING	
354	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4	88SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
355	TEMPORARY LABELS NOT REVIEWED PERIODICALLY, MADE PERMANENT OR REMOVED.	A6.7	6.6.5.2	65SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 91SS IN REPLACING TEMPORARIES WITH PERMANENT LABELS.
356	SWITCH HANDLES OBSCURE SWITCH POSITIONS.	B5.11	6.6.3.8, SEE COMMENTS	90SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	REPLACE SWITCH HANDLES. ENSURE CONFORMANCE WITH CNS HUMAN FACTOR STANDARDS.
357	TEMPORARY LABELS ARE BEING USED FOR BREAKER DESIGNATION.	A5.12, A6.1	6.6.5.1, SEE COMMENTS	91SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
358	TEMPORARY LABELS NOT ADMINISTRATIVELY CONTROLLED.	A6.2	6.6.5.2	92SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	DEVELOP AN ADMINISTRATIVE PROCEDURE THAT ADDRESSES THE NEED FOR TEMPORARIES, AND HOW AND WHERE THEY WILL BE USED.
359	CHART RECORDER'S INKING SYSTEM SOMETIMES CLOGS.	B3.11	6.5.4.1, SEE COMMENTS	93SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	REPLACE THE TYPE OF INK USED IN THE CHART RECORDERS.
360	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	94SS	VBD-C	ENHANC.	A	FIX	3RD REFUELING	REPLACE SCALES PER CNS STANDARDS.
361	CONTROL MOVEMENT DOES NOT FOLLOW CONVENTIONAL PATTERN - CLOCKWISE MOVEMENT CAUSES DECREASE IN PARAMETER VALUE.	B2.7	6.9.3.1, SEE COMMENTS	95SS	VBD-C	DESIGN MOD	II	FIX	3RD REFUELING	REVIEW THE INDICATOR DESIGN RELATIVE TO MOVEMENT OF THE REGULATOR SWITCH AND CORRECT ACCORDINGLY.
362	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	96SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	NORMAL RANGES LIMITING CONDITIONS OF OPERATION, AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
363	HIGH RECORDERS ON PANEL EXPERIENCE SOME GLARE AND REFLECTION.	B3.12, B3.14	6.1.2.2	97SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF USING NON-GLARE GLASS OR TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
364	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	A3.7, SA3	6.4.2.2, 6.5.1.6, 6.6.6.4*	98SS	VBD-C	DESIGN MOD.	II	FIX	3RD REFUELING	INTEGRATE WITH HED 79SS FOR POSSIBILITY OF RELOCATING CONTROLS & INDICATIONS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
365	ANNUNCIATOR NOT GROUP WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEMS.	C1.1,C 1.2	6.3.3.1 (SEE MISC/COM MENTS)	99SS	VBD-C	OTHER MOD.	III	NO ACTION	N/A	A MINOR DISCREPANCY. THE TWO ALARM BOXES ARE ADJACENT, AND ARE LOCATED IN THE SAME PANEL.
366	ANNUNCIATORS ARE NOT GROUPED ABOVE RELATED DISPLAYS.	C1.2	6.3.1.1	100SS	VBD-C	OTHER MOD.	III	NO ACTION	N/A	A MINOR DISCREPANCY. ALARMS ARE ADJACENT TO DISPLAYS.
367	WARNING & DIAGNOSTIC ALARMS NOT SEGREGATED FROM INFORMATIONAL AND ADVISORY ALARMS.	C1.3	6.3.3.3	101SS	VBD-C	OTHER MOD.	III	NO ACTION	N/A	A MINOR DISCREPANCY. INFORMATIONAL ALARMS ARE ALSO WARNING ALARMS.
368	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE SIZE.	C2.2	6.3.3.4, 6.3.3.5, SEE COMMENTS	102SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	THE ANNUNCIATOR TILE IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.
369	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.	C2.7	6.3.3.4, SEE COMMENTS	103SS	VBD-C	OTHER MOD.	III	NO ACTION*	NONE	*NO SAFETY SIGNIFICANCE. SAME ACTION WILL BE TAKEN UNDER ALL CONDITIONS COVERED BY THIS ALARM.
370	ALARM WINDOWS WITH MULTIPLE CHOICE INDICATION.	C2.7	6.3.3.4	104SS	VBD-C	OTHER MOD.	II	FIX	3RD REFUELING	IDENTIFY THOSE MUILTIPLE-CHOICE INDICATION ALARMS THAT ARE CRITICAL TO SAFETY. WHERE VISUAL INDICATORS NOT AVAILABLE ON THE PANEL TO VERIFY THE HIGH OR LOW INPUTS, ALARMS WILL BE SEPARATED TO SINGLE-CHOICE INDICATIONS.
371	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.	C5.5	6.3.4.2 (SEE MISC/COM MENTS)	105SS	VBD-C	DESIGN MOD.	II	FIX	3RD REFUELING	REVIEW THE NEED FOR TWO ALARM RESPONSE SYSTEMS ON THIS PANEL VS. ONE ALARM SYSTEM USED ON ALL OTHER PANELS. STANDARDIZE SWITCH ARRANGEMENT SIMILAR TO OTHER PANELS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
398	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	A5.4	6.6.1.1, 6.6.3.1	132SS	VBD-C	ENHANC.	B	FIX	3RD REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES THE PANEL FUNCTION, AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SCHEME.
1	CONTROLS, & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES. CONTROL SWITCHES LOCATED 23" BELOW MIN. LIMITS. VISUAL DISPLAYS LOCATED 17 BELOW MIN. LIMITS. VISUAL DISPLAYS LOCATED 13" ABOVE MAX. LIMITS.	A1.1 & A3.6	6.1.2	1S	VBD-H	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 7S. RELOCATE CONTROL AND DISPLAYS IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
7	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.2	6.6.6.1, 6.6.6.2, 6.8.1.3*	7S	VBD-H	ENHANC.	B	FIX	2ND REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
20	CONTROLS NOT ADJACENT TO RELATED FEEDBACK INDICATION	A3.7	6.8.1.1, 6.8.2.1, 6.9.1.1*	20S	VBD-H	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 1S. RELOCATE CONTROLS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS.
24	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2	6.5.1.6, 6.5.2.7, 6.6.6*	24S	VBD-H	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
41	TEMPORARY LABELS NOT PERIODICALLY REVIEWED TO MAKE PERMANENT OR REMOVE.	A6.7	6.6.5.2, SEE COMMENTS	41S	VBD-H	ENHANC.	B	FIX	2ND REFUELING	DEVELOP SPECIFIC CNS ADMINISTRATIVE PROCEDURES TO GOVERN THE USE OF TEMPORARY LABELS WHICH WILL BE IN COMPLIANCE WITH NUREG 0700 GUIDELINES.
52	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	SA3	6.4.2.2, 6.5.1.6, 6.6.6.4	52S	VBD-H	DESIGN MOD.	II	FIX	2ND REFUELING	INTEGRATE WITH HED 1S, 7S AND 20S FOR POSSIBILITY OF RELOCATING INDICATIONS TO PROVIDE NECESSARY DEMARCATION OF SUBGROUPS.
61	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	61S	VBD-H	ENHANC.	B	FIX	2ND REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
83	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	83S	VBD-H	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH 61S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
93	RECORDER SCALES NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3 (SEE MISC/COMMENTS)	93S	VBD-H	ENHANC.	B	FIX	2ND REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOP'S OR RECORDER SCALES.
100	CONTROL SWITCHES LOCATED 23" BELOW RECOMMENDED HEIGHTS.	B5.3	6.1.2	100S	VBD-H	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 1S AND 20S. RELOCATE CONTROLS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
109	CODING BY SIZE, SHAPE OR COLOR NOT USED TO IDENTIFY SWITCH BY TYPE OR FUNCTION.	B5.10	6.4.2.2 (SEE COMMENTS)	109S	VBD-H	ENHANC.	B	FIX	2ND REFUELING	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
125	DISPLAYS REFLECTING ONLY DEMAND SIGNAL NOT LABELED ACCORDINGLY.	SB1.3	6.5.1.1, 6.6.3.1, SEE COMMENTS	125S	VBD-H	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS WHERE REQUIRED IN ACCORDANCE WITH SPECIFIC STATION STANDARDS FOR LABELING. ENSURE PROPER OPERATOR TRAINING AND UPDATE OF MANUALS AND PROCEDURES WHERE APPLICABLE.
151	LOCATION AND DEMARCATION OF ANNUNCIATOR RESPONSE BUTTONS NOT CONSISTENT WITH OTHER PANELS.	C5.5	6.3.4.2, SEE COMMENTS	151S	VBD-H	DESIGN MOD.	III	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB'S ON TOP ROW, AND "TEST" ON BOTTOM ROW. SEE CNS HF STANDARDS.
161	ANNUNCIATOR RESPONSE CONTROLS NOT CODED FOR EASE OF RECOGNITION.	SC2	6.3.4.2, SEE COMMENTS	161S	VBD-H	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 151S. ENCLOSE THE CONTROLS WITH DEMARCATION LINES IN ACCORDANCE WITH CNS HF STANDARDS.
472	SUBGROUPS WITHIN SYSTEM ARE NOT PROPERLY LAID-OUT SO THAT FLOW PATHS CAN BE EASILY CONSTRUCTED	A2.7	6.6.6.4, 6.8.2.2, SEE COMMENTS	198SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	RELOCATE SWITCHES OR IMPROVE EXISTING DEMARCATION SO THAT FLOW PATH CAN BE LAID-OUT IN ACCORDANCE WITH CNS HF STANDARDS.
473	STRINGS AND MATRICES OF COMPONENTS OF SIMILAR FUNCTIONS NOT DIFFERENTIATED BY DEMARCATION OR HEIRARCHICAL LABELING.	A3.4	6.6.1.2, 6.6.6.2, SEE COMMENTS	199SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED AND . NEW LABELING SHOULD BE MERGED WITH EXISTING LABELS IN HIERARCHICAL FORM.

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RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
474	POSSIBLE DUAL MEANING FOR COLOR OF INDICATING LIGHTS.	A4.3	6.5.3.2, SEE COMMENTS	200SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	REPLACE COLOR OF INDICATING LIGHTS IN ACCORDANCE WITH CNS HF STANDARDS.
475	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	A5.3	6.6.1.1, 6.6.3.1, SEE COMMENTS	201SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.
476	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	A5.4	6.6.1.1, 6.6.3.1	202SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
477	INCONSISTENT TYPE STYLE AND APPLICATION OF TYPE SIZE.	A5.6	6.6.4.1, SEE COMMENTS	203SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
478	LABELS AND LEGEND PLATES, NOT UNIFORMLY POSITIONED FOR FUNCTIONAL CLARITY.	A5.11	6.6.2.1, SEE COMMENTS	204SS	VBD-H	DESIGN MOD	III	FIX	2ND REFUELING	RELOCATE LABELS AND LEGEND PLATES IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
479	EXTENSIVE TEMPORARY LABELS ARE BEING USED.	A6.1	6.6.5.1, SEE COMMENTS	205SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
480	UNIDENTIFIABLE PROCESS UNITS	B2.3	6.5.1.4	206SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	IDENTIFY PROCESS UNITS ON FACE OF RECORDER.
481	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	207SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	REPLACE SCALES PER CNS STANDARDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
482	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	B2.13	6.5.1.5	208SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	REPLACE SCALES IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
483	PRINTED VALUES DO NOT CORRESPOND TO SCALE VALUES.	B3.2	6.5.4.1, SEE COMMENTS	209SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	REPLACE CHART PAPER.
484	APPLICATION OF SYMBOLS FOR PROCESS ELEMENTS NOT CONSISTENT AMONG PANELS.	A2.12	6.6.6.4, SEE COMMENTS	210SS	VBD-H	ENHANC	B	FIX	2ND REFUELING	DEVELOP STANDARD SYMBOLS FOR PROCESS ELEMENTS AS A PART OF CNS HUMAN FACTOR ENGINEERING STANDARDS. IMPLEMENT PER THE STANDARDS.
485	LABELING OF SUBSYSTEM GROUPINGS NOT CONSISTENTLY APPLIED	A3.5	6.6.2.1, 6.6.3.1, SEE COMMENTS	211SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 185. FABRICATE NEW LABELING THAT DESCRIBES FUNCTION OF THE SYSTEMS IN ACCORDANCE WITH CNS HF STANDARDS.
486	LEGEND PLATES IDENTIFYING OPERATIONAL LIMITS NOT CLEAR OR STANDARD.	A5.2	6.6.3	212SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	DEVELOP STANDARD FORMAT FOR LEGEND PLATES THAT IDENTIFY EQUIPMENTS' OPERATIONAL LIMITS. IMPLEMENT PER THE STANDARDS.
487	SWITCH LABELS FOR FAN COIL UNITS ARE HARD TO READ.	A5.9	6.6.4.1, SEE COMMENTS	213SS	VBD-H	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
488	INDICATOR POINTERS OF HONEWELL CONTROLLERS OBSCURE SCALE NUMERALS	B2.5	6.5.2.2, SEE COMMENTS	214SS	VBD-H	OTHER MOD	N/A	NO ACTION REQUIRED*	NONE	*CONTROLLERS ARE NOT IN USE. THEY HAVE BEEN REMOVED.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
68	INSTRUMENTS NOT SCALED IN PROCESS UNITS RELATING TO SYSTEM OPERATION.	B2.3, B3.2	6.5.1.2, SEE MISC/COMMENTS	68S	VBD-J	ENHANC.	A	NONE, CORRECTION MADE*	1ST REFUELING	*CHART PAPER REPLACED.
84	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	84S	VBD-J	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 94S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
94	RECORDER SCALES NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3 (SEE MISC/COMMENTS)	94S	VBD-J	ENHANC.	A	FIX	1ST REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOPs OR RECORDER SCALES.
101	DISPLAYS LOCATED BELOW RECOMMENDED HEIGHTS.	B5.3	6.1.2	101S	VBD-J	DESIGN MOD.	II	FIX	1ST REFUELING	INTEGRATE WITH HED 186SS FOR RELOCATING RECORDER.
116	SWITCHES FOR EMERGENCY OR ABNORMAL USE NOT CONSISTENTLY MARKED.	B6.1&B 6.2	6.8.1.3, SEE COMMENTS	116S	VBD-J	ENHANC.	A	FIX	1ST REFUELING	CORRECTIONS SHOULD BE MADE IN ACCORDANCE WITH CNS HF STANDARDS.
144	ALARMS NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR	C2.8	6.3.1.4	144S	VBD-J	ENHANC.	A	FIX	1ST REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
152	ANNUNCIATOR RESPONSE BUTTONS AND DEMARCATION OF CONTROLS ARE INCONSISTENT WITH OTHER PANELS.	C5.5,5 C2	6.3.4.2, SEE COMMENTS	152S	VBD-J	DESIGN MOD.	II	FIX	1ST REFUELING	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB's ON TOP ROW, AND "TEST" ON BOTTOM ROW. SEE CNS HF STANDARDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
451	CONTROLS, & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	A3.6 & B5.3	6.1.2	186SS	VBD-J	DESIGN MOD.	II	FIX	1ST REFUELING	RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS.
452	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.3	6.6.6.1, 6.6.6.2, 6.8.1.3 &	187SS	VBD-J	ENHANC.	A	FIX	1ST REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
453	LACK OF COMPONENT IDENTIFICATION LABEL	5.1	LABELING INFORMATION	188SS	VBD-J	ENHANC.	A	FIX	1ST REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.
454	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4 &	189SS	VBD-J	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 215 FOR DEVELOPMENT & IMPLEMENTATION OF HUMAN FACTOR PLANT STANDARDS, THAT INCLUDE LABELING AND LIST OF STANDARD ABBREVIATIONS.
456	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	191SS	VBD-J	ENHANC.	A	FIX	1ST REFUELING	REPLACE SCALES PER CNS STANDARDS.
457	UNIDENTIFIABLE PROCESS UNITS	B2.3	6.5.1.4	72SS	VBD-J	ENHANC.	A	FIX	1ST REFUELING	IDENTIFY PROCESS UNITS ON FACE OF RECORDER. PROCESS UNITS SHOULD BE IN PSIG.
464	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES	A3.7, SA3	6.4.2.2, 6.5.1.6, 6.6.6.4	349SS	VBD-J	ENHANC.	A	FIX	1ST REFUELING	USE LABEL CODING TO DISTINGUISH BET DISC AND ACTUATOR INDICATING LIGHTS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
465	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES	C2.7	6.3.3.4, SEE COMMENTS	349SS	VBD-J	OTHER MOD.	II	NO ACTION	1ST REFUELING	FOR PANEL VBD-J WHERE THE ANNUNCIATORS ARE LOCATED, VISUAL INDICATORS FOR THE DISCHARGE HEADER PRESSURE ARE AVAILABLE ON THE ADJACENT PANEL VBD-M TO VERIFY THE HIGH OR LOW PRESSURE ALARMS.
466	ANNUNCIATOR NOMENCLATURE, ACRONYMNS, OR ABBREVIATIONS ARE NOT STANDARDIZED	C2.1	6.3.3.4, SEE COMMENTS	194SS	VBD-J	ENHANC.	II	FIX	1ST REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
467	ANNUNCIATORS NOT GROUPED ABOVE RELATED CONTROLS AND DISPLAYS	C1.2, C1.3	6.3.3.1, SEE COMMENTS	193SS	VBD-J	OTHER MOD.	II	NO ACTION	1ST REFUELING	NO CORRECTIVE ACTION IS TAKEN AS VBD-J AND VBD-M ARE ADJACENT, AND NO SPACE IS AVAILABLE ON VBD-M TO RELOCATE ALARMS.
468	POINTER COVERS RECORDER SCALE MARKING	B3.1	6.5.4.1, 6.5.4.2	192SS	VBD-J	ENHANC.	A	FIX	1ST REFUELING	REPLACE POINTER OR RAISE SCALE
2	CONTROLS, & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES. CONTROL SWITCHES LOCATED 28" BELOW MIN. LIMITS. VISUAL DISPLAYS LOCATED 20" BELOW MIN. LIMITS.	A1.1	6.1.2	2S	VBD-K	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	CONCEPTUAL DESIGN OF PANELS WILL UTILIZE TILTING OF TOP INSTRUMENTS AND RELOCATION OF LOWER CONTROLS.
53	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	SA3	6.4.2.2, 6.5.1.6, 6.6.6.4*	53S	VBD-K	ENHANC.	II	FIX	2ND REFUELING	INTEGRATE WITH HED 136SS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.

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1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
62	INDICATOR NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	62S	VBD-K	ENHANC.	FIX	FIX	MAY '85	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
102	CONTROL SWITCHES LOCATED 28" BELOW RECOMMENDED HEIGHTS.	B5.3	6.1.2	102S	VBD-K	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 2S IN RELOCATING CONTROLS.
111	CODING BY SIZE, SHAPE OR COLOR NOT USED TO IDENTIFY SWITCH BY TYPE OR FUNCTION.	B5.10	6.4.2.2 (SEE COMMENTS)	112S	VBD-K	ENHANC.	B	FIX	2ND REFUELING	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
126	DISPLAYS REFLECTING ONLY DEMAND SIGNAL NOT LABELED ACCORDINGLY.	SB1.3	6.5.1.1, 6.6.3.1	126S	VBD-K	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS WHERE REQUIRED IN ACCORDANCE WITH SPECIFIC STATION STANDARDS FOR LABELING. ENSURE PROPER OPERATOR TRAINING AND UPDATE OF MANUALS AND PROCEDURES WHERE APPLICABLE.
145	ALARMS NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	C2.8	6.3.1.4 (SEE MISC/COMMENTS)	145S	VBD-K	ENHANC.	A	FIX	2ND REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
162	ANNUNCIATOR RESPONSE CONTROLS NOT CODED FOR EASE OF RECOGNITION.	SC2	6.3.4.2, SEE COMMENTS	162S	VBD-K	ENHANC.	A	FIX	MAY '85	INTEGRATE WITH HED 147SS. ENCLOSE THE CONTROLS WITH DEMARCATION LINES IN ACCORDANCE WITH CNS HF STANDARDS.

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RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
402	DEMARCATIONS, MIMICS NOT IDENTICAL IN LAYOUT FOR REPETITIVE GROUPINGS OF COMPONENTS.	A2.8	6.8.2.3, SEE COMMENTS	136SS	VBD-K	DESIGN MOD	II	FIX	2ND REFUELING	INTEGRATE WITH HED 2S. RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
403	CONTROLS & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	A3.6	6.1.2	137SS	VBD-K	DESIGN MOD.	II	FIX	2ND REFUELING	RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS. FOR THOSE METERS THAT WILL OT BE RELOCATED, UTILIZE TILTING OF DISPLAYS TO IMPROVE READABILITY.
404	CONTROLS & DISPLAY COMPONENTS NOT LOCATED WITHIN AN ARM REACH OF FEEDBACK INDICATIONS	A3.7	6.8.1.1, 6.8.2.1, 6.9.1.1*	138SS	VBD-K	DESIGN MOD.	II	FIX-PER FEASIBILIT Y STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 1S. RELOCATE CONTROLS AND ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATION.
405	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2	6.5.1.6, 6.5.2.3, 6.6.6 *	139SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
406	POSSIBLE DUAL MEANING FOR COLOR OF INDICATING LIGHTS.	A4.3	6.5.3.2, SEE COMMENTS	140SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	REPLACE COLOR OF INDICATING LIGHTS IN ACCORDANCE WITH CNS HF STANDARDS.
407	LACK OF COMPONENT IDENTIFICATION.	A5.1	6.6.1.1, 6.6.3.1, SEE COMMENTS	141SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS THAT DESCRIBE THE FUNCTION OF EQUIPMENT ITEM AND COMPONENT ID.

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RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
408	LEGEND PLATES IDENTIFYING OPERATIONAL LIMITS NOT CLEAR OR STANDARD.	A5.2	6.6.3	142SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	DEVELOP STANDARD FORMAT LEGEND PLATES THAT IDENTIFY EQUIPMENTS' OPERATIONAL LIMITS. IMPLEMENT PER THE STANDARDS.
409	LOW INDICATORS ARE DIFFICULT TO READ WHEN STATIONED AT PANEL.	B2.2	6.1.2.2	143SS	VBD-K	DESIGN MOD.	B	FIX	2ND REFUELING	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. INTEGRATE WITH HED 25.
410	ANNUNCIATORS WARNING & DIAGNOSTIC ALARMS ARE NOT SEGREGATED FROM INFORMATIONAL AND ADVISORY ALARMS.	C1.3	6.3.3.3	144SS	VBD-K	OTHER MOD.	III	NO ACTION	NONE	MINOR DISCREPANCY. NO ACTION REQUIRED.
411	ANNUNCIATOR NOMENCLATURE AND ABBREVIATIONS ARE NOT STANDARDIZED.	C2.1	6.3.3.4 (SEE COMMENTS)	145SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
412	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	C2.8	6.3.1.4 (SEE MISC/COMMENTS)	146SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
413	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.	C5.5	6.3.4.2 (SEE MISC/COMMENTS)	147SS	VBD-K	DESIGN MOD.	II	FIX	2ND REFUELING	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB'S ON TOP ROW, AND TEST ON BOTTOM ROW. SEE CNS HF STANDARDS.
489	MIMIC HAS NO ARROWS NOTING DIRECTION OF FLOW.	A2.9	6.6.6.4, SEE COMMENTS	215SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	MODIFICATION BY ENHANCEMENT TECHNIQUES IN AGREEMENT WITH SPECIFIC STATION STANDARDS AND NUREG 0700 GUIDELINES.
490	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	216SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	REPLACE SCALES PER CNS STANDARDS.
491	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	B2.13	6.5.1.5	217SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
492	INDICATOR INFORMATION NOT EASILY READ.	B2.4	6.5.1.1, 6.5.2.2, SEE COMMENTS	218SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	EXAMINE INDICATORS AND DETERMINE COMPLIANCE OF INDICATOR DISPLAYED INFORMATION WITH CNS HF STANDARDS AND NUREG 0700.
493	SUBGROUPS WITHIN SYSTEM ARE NOT PROPERLY LAID-OUT SO THAT FLOW PATHS CAN BE EASILY CONSTRUCTED.	A2.7	6.6.6.4, 6.8.2.2, SEE COMMENTS	219SS	VBD-K	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	RELOCATE SWITCHES OR IMPROVE EXISTING DEMARCATION SO THAT FLOW PATH CAN BE LAID-OUT IN ACCORDANCE WITH CNS HF STANDARDS.
494	MIMICS NOT INTEGRATING SYSTEM COMPONENTS.	A2.11	6.6.6.4, 6.8.2.2, SEE COMMENTS	220SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
495	ANNUNCIATOR NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEMS.	C1.1, C1.2	6.3.3.3 (SEE MISC/COMMENTS)	221SS	VBD-K	OTHER MOD.	III	NO ACTION	N/A	A MINOR DISCREPANCY. THE TWO ALARM BOXES ARE ADJACENT, AND ARE LOCATED IN THE SAME PANEL.
496	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	A5.6	6.6.4.1, SEE COMMENTS	222SS	VBD-K	ENHANC.	E	FIX	2ND REFUELING	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
497	CONTROLLER'S HEIGHT CAUSES DIFFICULTY IN IDENTIFYING MODE POSITIONS.	B1.3	6.1.2.2	223SS	VBD-K	DESIGN MOD	II	FIX	2ND REFUELING	INTEGRATE WITH HED 2S IN RELOCATING THE CONTROLLERS.
498	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4#	224SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
499	APPLICATION OF SYMBOLS FOR PROCESS ELEMENTS NOT CONSISTENT AMONG PANELS.	A2.12	6.6.6.4, SEE COMMENTS	225SS	VBD-K	ENHANC.	B	FIX	2ND REFUELING	DEVELOP STANDARD SYMBOLS FOR PROCESS ELEMENTS AS A PART OF CNS HUMAN FACTOR ENGINEERING STANDARDS. IMPLEMENT PER THE STANDARDS.
500	INDICATOR POINTERS OF HONEYWELL CONTROLLERS OBSCURE SCALE NUMERALS.	B2.5	6.5.2.2, SEE COMMENTS	226SS	VBD-K	OTHER MOD	N/A	NO ACTION REQUIRED*	NONE	*CONTROLLERS ARE NOT IN USE. THEY HAVE BEEN REMOVED.
3	CONTROLS, & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES. CONTROL SWITCHES LOCATED 19" BELOW MIN. LIMITS. VISUAL DISPLAYS LOCATED 24" BELOW MINIMUM LIMITS. VISUAL DISPLAYS LOCATED 11" ABOVE MAX. LIMITS.	A1.1 & A3.6	6.1.2	3S	VBD-M	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	CONCEPTUAL DESIGN OF PANELS WILL UTILIZE TILTING OF TOP INSTRUMENTS AND RELOCATION OF LOWER CONTROLS.

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1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
25	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2	6.5.1.6, 6.5.2.3, 6.6.6 *	25S	VBD-M	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
34	LABELS NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	A5.10	6.6.2.1, 6.6.3.1 SEE COMMENTS	34S	VBD-M	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
63	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	63S	VBD-M	ENHANC.	B	FIX	2ND REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
67	VERY LOW INDICATORS ON PANEL INTRODUCE PARALLAX. INDICATORS LOCATED 28° BELOW MIN. LIMITS.	B2.2	6.1.2	67S	VBD-M	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 3S. REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
103	CONTROL SWTCHES LOCATED 19° BELOW RECOMMENDED LIMITS.	B5.3	6.1.2	103S	VBD-M	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	2ND REFUELING	INTEGRATE WITH HED 3S. RELOCATE CONTROLS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
112	CODING BY SIZE, SHAPE OR COLOR NOT USED TO IDENTIFY SWITCH BY TYPE OR FUNCTION.	B5.10	6.4.2.2 (SEE COMMENTS)	112S	VBD-M	ENHANC.	B	FIX	2ND REFUELING	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
139	ANNUNCIATORS' NOMENCLATURE, ACRONYMS OR ABBREVIATIONS NOT STANDARDIZED.	C2.1	6.3.3.4 (SEE COMMENTS)	139S	VBD-M	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDLINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
146	ALARMS NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	C2.8	6.3.1.4 (SEE MISC/COM MENTS)	146S	VBD-M	ENHANC.	B	FIX	2ND REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
153	LOCATION AND DEMARCATION OF ANNUNCIATOR RESPONSE BUTTONS IS INCONSISTENT WITH OTHER PANELS.	C5.5	6.3.4.2, SEE COMMENTS	153S	VBD-M	DESIGN MOD.	III	FIX-PER FEASIBILIT Y STDY RECOM	2ND REFUELING	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB'S ON TOP ROW, AND TEST ON BOTTOM ROW. SEE CNS HF STANDARDS.
163	ANNUNCIATOR RESPONSE CONTROLS NOT CODED FOR EASE OF RECOGNITION.	SC2	6.3.4.2, SEE COMMENTS	163S	VBD-M	ENHANC.	A	FIX	MAY'85	INTEGRATE WITH HED 153S. ENCLOSE THE CONTROLS WITH DEMARCATION LINES IN ACCORDANCE WITH CNS HF STANDARDS.

APPENDIX D
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1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
346	CONTROL & DISPLAYS ARE NOT GROUPED BY SYSTEM WITH IDENTICAL LAYOUT FOR REPETITIVE GROUPS.	A3.1	6.8.1.1, 6.8.2.1, SEE COMMENTS	79SS	VBD-M	DESIGN MOD.	II	FIX	3RD REFUELING	INTEGRATE WITH HED 84SS. ENHANCEMENTS IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
501	TEMPORARY LABELS NOT PERIODICALLY REVIEWED TO MAKE PERMANENT OR REMOVE.	A6.7	6.6.5.2, SEE COMMENTS	227SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	DEVELOP SPECIFIC CNS ADMINISTRATIVE PROCEDURES TO GOVERN THE USE OF TEMPORARY LABELS WHICH WILL BE IN COMPLIANCE WITH NUREG 0700 GUIDELINES.
502	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	SA3	6.5.2.2, 6.5.1.6, 6.6.a.4*	228SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	INTEGRATE WITH HED 3S TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
503	ANNUNCIATORS NOT GROUPED WITHIN ANNUNCIATOR BOX BY SPECIFIC SYSTEM.	C1.1	6.3.3.3 (SEE MISC/COMMENTS)	229SS	VBD-M	OTHER MOD.	III	NO ACTION	NONE	A MINOR DISCREPANCY. ALARM BOXES ARE ADJACENT.
504	WARNING AND DIAGNOSTIC ALARMS NOT SEGREGATED FROM INFORMATION AND ADVISORY ALARMS.	C1.3	6.3.3.3	230SS	VBD-M	OTHER MOD.	III	NO ACTION	NONE	DISCREPANCY COULD NOT BE VERIFIED. THE INFORMATION ALARMS ON THIS PANEL ARE ALSO CONSIDERED WARNING AND DIAGNOSTIC ALARMS.
505	ANNUNCIATOR LEGEND TILE TERMINOLOGY IS NOT CONSISTENT WITH THE INPUT SIGNAL FUNCTION.	C2.5	6.3.3.4 (SEE MISC/COMMENTS)	231SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES AND ENSURE CONFORMANCE WITH SYSTEM DESIGNATION & CONTROLS LABELING.
506	LABELS AND LEGEND PLATES, NOT UNIFORMLY POSITIONED FOR FUNCTIONAL CLARITY.	A5.11	6.6.2.1, SEE COMMENTS	232SS	VBD-M	DESIGN MOD	III	FIX	2ND REFUELING	RELOCATE EXISTING LABELS IN COMPLIANCE WITH SPECIFIC STATION STANDARDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
507	LABELS ARE NOT SIZE CODED IN A HIERARCHICAL SYSTEM	A5.7	6.6.3.2, 6.6.3.3, 6.6.3.4#	233SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
508	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	234SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	REPLACE SCALES PER CNS STANDARDS.
509	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	B2.13	6.5.1.5	235SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
510	HIGH INDICATORS ON THE PANEL EXPERIENCE GLARE & REFLECTION	B2.2, SB1.1	6.1.2.2	236SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
511	CONTROL & DISPLAYS ARE NOT GROUPED BY SYSTEM WITH IDENTICAL LAYOUT FOR REPETITIVE GROUPS.	A3.1	6.8.1.1, 6.8.2.1, SEE COMMENTS	237SS	VBD-M	DESIGN MOD.	II	FIX	2ND REFUELING	INTEGRATE WITH HED 84SS. ENHANCEMENTS IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
512	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	A5.6	6.6.4.1, SEE COMMENTS	238SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.

APPENDIX D
I. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
513	TEMPORARY LABELS NOT CONSISTENT AND CONTROLLED IN NOMENCLATURE, AND COLOR.	A6.3	6.6.5.1, SEE COMMENTS	239SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	REVIEW THE NEED FOR TEMPORARY LABELS AND REPLACE WITH PERMANENT LABELS. ENHANCE THOSE NOT REPLACED IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
514	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4*	240SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXCERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
515	CONTROL SWITCH POSITION NOT CLEARLY MARKED.	B5.2	6.6.3.8	241SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	PURCHASE OR FABRCIATE NEW LENGEND LABELS WHICH REFLECT CONTROL POSITION. THE NEW LABELS SHOULD BE CONSISTENT WITH EXISTING LABELS IN TERMS OF COLOR, LETTER SIZE, TERMINOLOGY, SIZE AND LOCATION. ALL LABELS SHOULD BE PERMANENTLY ATTACHED.
516	LEGEND PLATES IDENTIFYING OPERATIONAL LIMITS NOT CLEAR OR STANDARD.	A5.2	6.6.3	242SS	VBD-M	ENHANC.	B	FIX	2ND REFUELING	DEVELOP STANDARD FORMAT FOR LEGEND PLATES THAT IDENTIFY EQUIPMENTS' OPERATIONAL LIMITS. IMPLEMENT PER THE STANDARDS.
10	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.2	6.6.6.1, 6.6.6.2, 6.8.1.3*	10S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
17	DEMARCATION OR SEQUENCING WITHIN SYSTEM GROUPING NOT APPARENT.	A3.3	6.8.2.1, 6.9.2.1, SEE COMMENTS	17S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 10S.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
28	PERMANENT LABELS NEEDED TO REPLACE OPERATOR ADDITIONS.	A5.2	6.6.5	28S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
35	LABELS NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	A5.10	6.6.2.1. 6.6.3.1 SEE COMMENTS	35S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DESCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
43	TEMPORARY LABELS NOT PERIODICALLY REVIEWED TO MAKE PERMANENT OR REMOVE.	A6.7	6.6.5.2	43S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 28S IN REPLACING TEMPORARIES WITH PERMANENT LABELS.
66	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COM MENTS)	66S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
70	INSTRUMENTS NOT SCALED IN PROCESS UNITS RELATING TO SYSTEM OPERATION.	B2.3	6.5.1.2, SEE MISC/COM MENTS	70S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	SCALE CHANGES SHOULD BE PERFORMED BY MINOR DESIGN CHANGE. ENSURE APPROPRIATE CALIBRATION & SURVEILLANCE PROCEDURES ARE UPDATED. ENSURE APPROPRIATE OPERATOR TRAINING WILL BE CONDUCTED.
73	FAILURE MODE OF INSTRUMENTS NOT EVIDENT.	B2.17	6.5.1.1	73S	VBD-P1&P2	OTHER MOD.	III	NO ACTION	NONE	INDICATORS BASICALLY FAIL DOWNSCALE. CORRELATION WITH OTHER INDICATIONS VERIFY INSTRUMENT FAILURE.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
87	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	87S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 66S, 97S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
97	RECORDER SCALES NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3 (SEE MISC/COMMENTS)	97S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOP'S ON RECORDER SCALES.
117	SWITCHES FOR EMERGENCY OR ABNORMAL USE NOT CONSISTENTLY MARKED.	B6.1&B 6.2	6.8.1.3, SEE COMMENTS	117S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	MARKING OF THE EMERGENCY SWITCHES SHOULD BE MADE IN ACCORDANCE WITH CNS HF STANDARDS.
128	DISPLAYS REFLECTING ONLY DEMAND SIGNAL NOT LABELED ACCORDINGLY.	SB1.3	6.5.1.1, 6.6.3.1	128S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELS WHERE REQUIRED IN ACCORDANCE WITH SPECIFIC STATION STANDARDS FOR LABELING. ENSURE PROPER OPERATOR TRAINING AND UPDATE OF MANUALS AND PROCEDURES WHERE APPLICABLE.
131	PROCESS UNITS AND MULTIPLIERS NOT SPECIFIED	SB1.4	6.5.1.4	131S	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	IDENTIFY PROCESS UNITS AND MULTIPLIERS ON FACE OF FLOW RECORDERS AND INDICATING CONTROLLERS.
148	ALARMS NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	C2.8	6.3.1.4 (SEE MISC/COMMENTS)	148S	VBD-P1&P2	ENHANC.	B	FIX	2ND REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.

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1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
157	NO METHOD AVAILABLE TO ASSURE PLACING ANNUNCIATOR PLATE IN CORRECT LOCATION DURING BULB REPLACEMENT.	CB.1	6.3.3.1. C	157S	VBD-P1&P2	DESIGN MOD.	II	FIX	3RD REFUELING	PLACE ANNUNCIATOR IDENTIFIERS ON ALARM TILES.
424	CONTROLS AND DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	A1.1 & A3.6	6.1.2	158SS	VBD-P1&P2	DESIGN MOD	II	FIX	3RD REFUELING	REVIEW THE NEED FOR MOVING DISPLAYS AND CONTROLS. RELOCATE IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.
428	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2	6.5.1.6, 6.5.2.3, 6.6.6*	162SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION, MIMICS, ZONE MARKING OF DISPLAYS, FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.
429	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	A5.3	6.6.1.1, 6.6.3.1, SEE COMMENTS	163SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELS IDENTIFING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.
430	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	A5.4	6.6.1.1, 6.6.3.1	164SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
431	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	A5.6	6.6.4.1, SEE COMMENTS	165SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
434	LABELS ARE NOT SIZE CODED IN A HIERARCHICAL SYSTEM.	A5.7	6.6.3.2, 6.6.3.3, 6.6.3.4*	168SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

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1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
528	LABELS ARE NOT PERMANENTLY MOUNTED	A5.12	6.6.2.2, SEE COMMENTS	254SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
530	EXTENSIVE TEMPORARY LABELS ARE BEING USED.	A6.1	6.6.5.1, SEE COMMENTS	256SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
531	TEMPORARY CHANGES OR MODIFICATIONS ARE NOT CONTROLLED IN APPLICATION OR INCORPORATED IN ADMINISTRATIVE PROCEDURES.	A6.2, A6.5	6.6.5.2	257SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	DEVELOP AN ADMINISTRATIVE PROCEDURE THAT ADDRESS THE NEED FOR TEMPORARIES, AND HOW AND WHERE THEY WILL BE USED.
532	INDICATOR POINTER OBSCURE SCALE NUMERALS.	B2.5	6.5.2.2, SEE COMMENTS	258SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH NUREG 0700 GUIDELINES.
534	INDICATING LIGHTS DO NOT INDICATE POSITIVE STATE OR POSITIVE RESPONSE. EXTINGUISHED LIGHT MEANS VALVE IS ACTUATED.	B4.2	6.5.3.1 (SEE MISC/COMMENTS)	260SS	VBD-P1&P2	DESIGN MOD.	II	FIX	3RD REFUELING	CORRECTIONS SHOULD BE MADE IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
536	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	262SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	REPLACE SCALES PER CNS STANDARDS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
539	WARNING AND DIAGNOSTIC ALARMS NOT SEGREGATED FROM INFORMATION AND ADVISORY ALARMS.	C1.3	6.3.3.3	265SS	VBD-P1&P2	OTHER MOD.	III	NO ACTION	3RD REFUELING	DISCREPANCY COULD NOT BE VERIFIED. THE INFORMATION ALARMS ON THIS PANEL ARE ALSO CONSIDERED WARNING AND DIAGNOSTIC ALARMS.
544	MULTI-CHANNEL RECORDER DOES NOT DISPLAY CHANNEL BEING PLOTTED. INFORMATION IS NOT EASILY EXTRACTED.	SB2.2	6.5.4.2	270SS	VBD-P1&P2	DESIGN MOD.	II	FIX	3RD REFUELING	EXAMINE RECORDER DESIGN AND MAKE NECESSARY MODIFICATIONS TO DISPLAY RECORDER CHANNEL BEING PLOTTED.
550	CONTROL & DISPLAYS ARE NOT GROUPED BY SYSTEM WITH IDENTICAL LAYOUT FOR REPETITIVE GROUPS.	A3.1	6.8.1.1, 6.8.2.1, SEE COMMENTS	276SS	VBD-P1&P2	ENHANC.	II	FIX	3RD REFUELING	INTEGRATE WITH HED 158SS. ENHANCEMENTS IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
563	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.3	6.6.6.1, 6.6.6.2, 6.8.1.3*	289SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
564	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS.	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4*	290SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
565	SWITCH LABELS FOR FAN COIL UNITS ARE HARD TO READ.	A5.9	6.6.4.1, SEE COMMENTS	291SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
566	HIGH RECORDERS ON PANEL EXPERIENCE SOME GLARE AND REFLECTIONS.	B3.14		292SS	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF USING NON-GLARE GLASS OR TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
4	CONTROLS, & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES. CONTROL SWITCHES LOCATED 14" ABOVE MAX. LIMITS. VISUAL DISPLAYS LOCATED 27" BELOW MIN. LIMIT AND 11" ABOVE MAX. LIMITS.	A1.1 & A3.6	6.1.2	4S	VBD-Q46	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	3RD REFUELING	CONCEPTUAL DESIGN OF PANELS WILL UTILIZE TILTING OF TOP INSTRUMENTS AND RELOCATION OF LOWER CONTROLS.
8	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.2	6.6.6.1, 6.6.6.2, 6.8.1.3*	8S	VBD-Q46	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
26	LEGEND PLATES IDENTIFYING OPERATIONAL LIMITS NOT CLEAR OR STANDARD.	A5.2	6.6.3	26S	VBD-Q46	ENHANC.	B	FIX	3RD REFUELING	DEVELOP STANDARD FORMAT FOR LEGEND PLATES THAT IDENTIFY EQUIPMENTS' OPERATIONAL LIMITS. IMPLEMENT PER THE STANDARDS.
29	LABELS AND LEGEND PLATES NOT USED TO IDENTIFY SYSTEM DESIGNATION.	A5.3	6.6.1.1, 6.6.3.1, SEE COMMENTS	29S	VBD-Q46	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.
36	LABELS NOT CONSISTENTLY POSITIONED ABOVE OR BELOW LABELS.	A5.11	6.6.2.1, SEE COMMENTS	36S	VBD-Q46	ENHANC.	B	FIX	3RD REFUELING	RELOCATE EXISTING LABELS IN COMPLIANCE WITH SPECIFIC STATION STANDARDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
38	EXTENSIVE TEMPORARY LABELS ARE BEING USED.	A6.1	6.6.5.1, SEE COMMENTS	38S	VBD-046	ENHANC.	B	FIX	3RD REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
42	TEMPORARY LABELS NOT PERIODICALLY REVIEWED TO MAKE PERMANENT OR REMOVE.	A6.7	6.6.5.2	42S	VBD-046	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 38S IN REPLACING TEMPORARIES WITH PERMANENT LABELS.
71	DIGITAL READINGS ON KAMAN SYSTEM DO NOT CORRELATE WITH RECORDER READINGS.	B2.8	6.5.1, SEE COMMENTS	71S	VBD-046	DESIGN MOD.	II	FIX	3RD REFUELING	THE CONTINUOUS TREND RECORDER IS USED FOR BACKUP INDICATION, A PAPER AND SCALE CHANGE OF THE RECORDER MAY BE NECESSARY.
72	FAILURE MODE OF INSTRUMENTS NOT EVIDENT.	B2.17	6.5.1.1	72S	VBD-046	OTHER MOD.	III	NO ACTION	NONE	INDICATORS BASICALLY FAIL DOWNSCALE. CORRELATION WITH OTHER INDICATIONS VERIFY INSTRUMENT FAILURE.
76	RECORDER PRINTED VALUES NOT EASILY READ	B3.1	6.5.4.1, 6.5.4.2, SEE COMMENTS	76S	VBD-046	DESIGN MOD.	II	FIX	3RD REFUELING	INTEGRATE WITH 4S IN RAISING RECORDERS.
86	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	86S	VBD-046	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 96S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.
96	RECORDER SCALES NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3 (SEE MISC/COMMENTS)	96S	VBD-046	ENHANC.	B	FIX	3RD REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOP'S ON RECORDER SCALES.

APPENDIX D
I. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
99	SWITCH POSITIONS NOT CLEARLY MARKED.	B5.2	6.6.3.B	99S	VBD-B&G	ENHANC.	B	FIX	3RD REFUELING	PURCHASE OR FABRICATE NEW LEGEND LABELS WHICH REFLECT CONTROL POSITION. THE NEW LABELS SHOULD BE CONSISTENT WITH EXISTING LABELS IN TERMS OF COLOR, LETTER SIZE, TERMINOLOGY, SIZE AND LOCATION. ALL LABELS SHOULD BE PERMANENTLY ATTACHED.
119	INDICATOR SCALES NOT EASILY READ WHEN STATIONED AT THE PANEL.	SB1.1	6.5.1.3	119S	VBD-B&G	ENHANC.	B	FIX	3RD REFUELING	REPLACE SCALE WITH STANDARD SIZE LETTERING.
136	ANNUNCIATORS ON VBD-G NOT GROUPED ABOVE RELATED CONTROLS AND DISPLAYS OF VBD-G	C1.2	6.3.1.1, SEE COMMENTS	136S	VBD-B&G	DESIGN MOD.	III	FIX-PER FEASIBILITY STDY RECOM	3RD REFUELING	CORRECT THIS HED BY BRINGING THESE ANNUNCIATOR ALARMS CLOSER TO THE CONTROLS AND DISPLAYS ON ASSOCIATED PANELS.
147	ALARMS NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	C2.8	6.3.1.4 (SEE MISC/COMMENTS)	147S	VBD-B&G	ENHANC.	II	FIX	2ND REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
150	RESET BUTTON NOT PROVIDED - ACKNOWLEDGE BUTTON IS USED FOR RESET.	C5.1 & C5.3	6.3.4.C	150S	VBD-B&G	DESIGN MOD.	II	FIX	2ND REFUELING	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB'S ON TOP ROW, AND TEST ON BOTTOM ROW. SEE CNS HF STANDARDS.

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1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
552	PEN COLORS NOT CONSISTENT AMONG RECORDERS.	A3.10	N/A	278SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	STANDARDIZE PEN COLORS AMONG RECORDERS.
567	MULTI-SCALE AND LOGARITHMIC SCALE INDICATIONS ARE DIFFICULT TO READ.	SB1.2	6.5.1.5	293SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 119S.
568	RECORDER INFORMATION NOT READABLE FROM STANDING POSITION WITHOUT DOOR OPEN.	SB2.1	6.5.4.1, 6.5.4.2, (SEE COMMENTS)	294SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 4S IN RELOCATING RECORDER.
569	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.3	6.6.6.1, 6.6.6.2, 6.8.1.3*	295SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
570	CONTROLS & DISPLAYS NOT GROUPED IN FUNCTIONAL OR SEQUENTIAL RELATIONSHIP.	A3.3	6.8.2.1, 6.9.2.1, SEE COMMENTS	296SS	VBD-046	ENHANC	B	FIX	3RD REFUELING	INTEGRATE WITH HED 24SS.
571	CONTROLS & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	A3.6 & B5.3	6.1.2	297SS	VBD-046	DESIGN MOD.	II	FIX	3RD REFUELING	RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS. FOR THOSE METERS THAT WILL NOT BE RELOCATED, UTILIZE TILTING OF DISPLAYS TO IMPROVE READABILITY.
572	USE OF COLORS NOT CONSISTENTLY APPLIED ON PANEL.	A4.2	6.5.1.6, 6.5.2.3, 6.6.6*	298SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 21S FOR DEVELOPMENT OF HUMAN FACTOR PLANT STDS FOR THE CONTROL ROOM. PERFORM ENHANCEMENT TECHNIQUES IN FORMS OF DEMARCATION MIMICS, ZONE MARKING OF DISPLAYS, & FUNCTIONAL CODING OF CONTROLS & DISPLAYS UTILIZING SPEC COLOR CODING.

APPENDIX D
I. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
573	LACK OF PANEL FUNCTION IDENTIFICATION LABEL.	A5.4	6.6.1.1, 6.6.3.1	299SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	FABRICATE A NEW LABEL THAT DESCRIBES PANEL AND MERGE WITH EXISTING PANEL LABELING IN A HIERARCHICAL SYSTEM.
574	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4#	300SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
575	LABELS NOT CONSISTENT IN TYPE STYLE AND APPLICATION OF TYPE SIZE.	A5.6	6.6.4.1, SEE COMMENTS	301SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
576	LABELS ARE NOT SIZE CODED IN A HIERARCHICAL SYSTEM.	A5.7	6.6.3.2, 6.6.3.3, 6.6.3.4#	302SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
577	TEMPORARY LABELS ARE BEING USED FOR BREAKER DESIGNATION.	A5.12, A6.1	6.6.5.1, SEE COMMENTS	303SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
578	TEMPORARY LABELS NOT CONSISTENT AND CONTROLLED IN NOMENCLATURE, FONT AND COLOR.	A6.3	6.6.5.1, SEE COMMENTS	304SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 115SS AND 116SS FOR REPLACING WITH PERMANENT LABELS, AND ENHANCING THOSE NOT REPLACED IN ACCORDANCE WITH NUREG 0700 GUIDELINES.

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1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
579	CONTROLS REQUIRING MANUAL OPERATION NOT EASILY REACHED.	B1.1	6.1.2	305SS	VBD-046	DESIGN MOD.	II	FIX	3RD REFUELING	RELOCATE CONTROLLERS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATION.
580	INDICATORS ON THE PANEL EXPERIENCE GLARE & REFLECTION.	B2.2, SB1.1	6.1.2.2	306SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	REVIEW THE DISPLAYS IN QUESTION AND DETERMINE THEIR FREQUENCY OF USE AND THE PRECISION OR ACCURACY REQUIRED. DETERMINE IF TILTING THE DISPLAY WILL COMPENSATE FOR THE GLARE AND REFLECTION.
581	INSTRUMENTS ARE NOT SCALED IN PROCESS UNITS RELATING TO SYSTEM OPERATION.	B2.3	6.5.1.2, SEE MISC/COMMENTS	307SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	SCALE CHANGES SHOULD BE PERFORMED BY MINOR DESIGN CHANGE. ENSURE APPROPRIATE CALIBRATION & SURVEILLANCE PROCEDURES ARE UPDATED. ENSURE APPROPRIATE OPERATOR TRAINING WILL BE CONDUCTED.
582	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MULTIPLES OF 1, 2 OR 5.	B2.13	6.5.1.5	308SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
583	PRINTED VALUES DO NOT CORRESPOND TO SCALE VALUES.	B3.2	6.5.4.1, SEE COMMENTS	309SS	VBD-046	ENHANC.	B	FIX	3RD REFUELING	REPLACE CHART PAPER.
584	NO POSITIVE MEANS OF DIAGNOSING FAILED INDICATING LIGHTS AVAILABLE.	B4.4	6.4.3.3, 6.5.3.1, SEE COMMENTS	310SS	VBD-046	DESIGN MOD.	III	REASSESS PER NRC REGU. 9-5-85		EXISTING ANNUNCIATOR SYS AT CNS INCORPORATE TEST CAPABILITIES SO NO ACTION IS REQUIRED. FOR STATUS INDICATING LIGHTS REDUNDANT INDICATIONS ARE AVAILABLE TO DISTINGUISH FAILED LIGHTS. FOR PANEL 9-5, CONTROL ROD POSITIONS WILL BE IDENTIFIED ON SPDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
585	DISPLAYS LOCATED BELOW RECOMMENDED HEIGHTS.	B5.3	6.1.2	3115S	VBD-046	DESIGN MOD.	II	FIX	3RD REFUELING	INTEGRATE WITH HED 1865S FOR RELOCATING RECORDER.
586	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE SIZE.	C2.2	6.3.3.4, 6.3.3.5, SEE COMMENTS	3125S	VBD-046	ENHANC.	B	FIX	3RD REFUELING	THE ANNUNCIATOR TILE IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.
587	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	SA3	6.4.2.2, 6.5.1.6, 6.6.6.4#	3135S	VBD-046	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED 1065S TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
588	UNIDENTIFIABLE PROCESS UNITS.	SB1.4	6.5.1.4	3145S	VBD-046	ENHANC.	B	FIX	3RD REFUELING	IDENTIFY PROCESS UNITS ON FACE OF RECORDER.
589	ANNUNCIATOR RESPONSE CONTROLS NOT CODED FOR EASE OF RECOGNITION.	SC2	6.3.4.2, SEE COMMENTS	3155S	VBD-046	ENHANC.	B	FIX	3RD REFUELING	INTEGRATE WITH HED . ENCLOSE THE CONTROLS WITH DEMARCATION LINES IN ACCORDANCE WITH CNS HF STANDARDS.
55	CONTROLLERS REQUIRING MANUAL OPERATION NOT EASILY REACHED. CONTROLLER SWITCHES LOCATED 12" ABOVE MAX. LIMITS.	B1.1	6.1.2	55S	VBD-R	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	1ST REFUELING	INTEGRATE WITH HED 55S. RELOCATE CONTROL AND ASSOCIATED DISPLAYS IN ACCORDANCE WITH NUREG-0700 ANTHROPOMETRIC LIMITS.
64	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	64S	VBD-R	ENHANC.	A	FIX	1ST REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
85	ALARM POINTS NOT IDENTIFIED ON RECORDERS.	B3.3	6.5.2.3	85S	VBD-R	ENHANC.	B	FIX	1ST REFUELING	INTEGRATE WITH HED 95S. IDENTIFY NORMAL RANGES OF OPERATION & ENTRY TO EMERGENCY ON RECORDER. VERIFY THAT ALARM POINTS ARE BELOW OR AT THE EMERGENCY MARKING.

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1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
95	RECORDER SCALES NOT MARKED TO SHOW NORMAL OR ABNORMAL RANGES OF OPERATIONS.	B3.15	6.5.2.3 (SEE MISC/COMMENTS)	95S	VBD-R	ENHANC.	A	FIX	1ST REFUELING	IDENTIFY NORMAL RANGES OF OPERATION AND ENTRY TO EMERGENCY PER EOP'S OR RECORDER SCALES.
113	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OF FUNCTION.	B5.10	6.4.2.2 (SEE COMMENTS)	113S	VBD-R	ENHANC.	B	FIX	1ST REFUELING	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
127	DISPLAYS REFLECTING ONLY DEMAND SIGNAL NOT LABELED ACCORDINGLY.	SB1.3	6.5.1.1, 6.6.3.1, SEE COMMENTS	127S	VBD-R	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELS WHERE REQUIRED IN ACCORDANCE WITH SPECIFIC STATION STANDARDS FOR LABELING. ENSURE PROPER OPERATOR TRAINING AND UPDATE OF MANUALS AND PROCEDURES WHERE APPLICABLE.
132	RECORDER READING AT LOW-END OF SCALE NOT VISIBLE THROUGH RECORDER WINDOW.	SB2.1	6.5.4.1, 6.5.4.2, (SEE COMMENTS)	132S	VBD-R	ENHANC.	A	FIX	1ST REFUELING	EXAMINE RECORDER AND DETERMINE THE CAUSE OF OBSTRUCTION. PERFORM NECESSARY CORRECTIONS TO ENSURE SCALE VALUES ARE VISIBLE THROUGH RECORDER WINDOW.
154	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.	C5.5	6.3.4.2	154S	VBD-R	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	1ST REFUELING	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB'S ON TOP ROW, AND "TEST" ON BOTTOM ROW. SEE CNS HF STANDARDS.
399	LABELS ARE NOT VISUALLY DISTINCTIVE - RED LETTERS ON BLACK BACKGROUND.	A5.8	6.6.4.1	133SS	VBD-R	ENHANC.	B	FIX	1ST REFUELING	REPLACE EXISTING LABEL WITH A NEW LABEL THAT IS CONSISTENT W/LABELING THROUGHOUT THE CTRL ROOM.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
401	CONTROLLER'S HEIGHT CAUSES DIFFICULTY IN IDENTIFYING MODE POSITIONS.	B1.3	6.1.2.2	179SS	VBD-R	DESIGN MOD	II	FIX	1ST REFUELING	INTEGRATE WITH HED 194SS IN RELOCATING THE CONTROLLERS.
414	DEMARCATION LINES OR MIMICS NOT USED TO ENCLOSE RELATED DISPLAYS.	A2.2	6.6.6.1, 6.6.6.2, 6.8.1.3 *	148SS	VBD-R	ENHANC.	A	FIX	1ST REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
415	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.3	6.6.6.1, 6.6.6.2, 6.8.1.3 *	149SS	VBD-R	ENHANC.	B	FIX	1ST REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
416	ANALOG CONTROLLERS LOCATED ABOVE MAXIMUM LIMITS.	A3.6	6.1.2	150SS	VBD-R	DESIGN MOD.	II	FIX	1ST REFUELING	INTEGRATE WITH HED 55S. RELOCATE CONTROL AND ASSOCIATED DISPLAYS IN ACCORDANCE WITH NUREG-0700 ANTHROPOMETRIC LIMITS.
417	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	A5.10	6.6.2.1, 6.6.3.1 SEE COMMENTS	151SS	VBD-R	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELS CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPANCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
418	LABELS NOT CONSISTENTLY POSITIONED ABOVE OR BELOW LABELS.	A5.11	6.6.2.1, SEE COMMENTS	152SS	VBD-R	ENHANC.	B	FIX	1ST REFUELING	RELOCATE EXISTING LABELS IN COMPLIANCE WITH SPECIFIC STATION STANDARDS.
419	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	153SS	VBD-R	ENHANC.	B	FIX	1ST REFUELING	REPLACE SCALES PER CNS STANDARDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
420	CONTROL SWITCH POSITION NOT CLEARLY MARKED.	B5.2	6.6.3.B	154SS	VBD-R	ENHANC.	A	FIX	1ST REFUELING	PURCHASE OR FABRICATE NEW LEGEND LABELS WHICH REFLECT CONTROL POSITION. THE NEW LABELS SHOULD BE CONSISTENT WITH EXISTING LABELS IN TERMS OF COLOR, LETTER SIZE, TERMINOLOGY, SIZE AND LOCATION. ALL LABELS SHOULD BE PERMANENTLY ATTACHED.
421	ANNUNCIATOR NOMENCLATURE, ACRONYMS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	C2.1	6.3.3.4 (SEE COMMENTS)	155SS	VBD-R	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
422	MULTIPLE CHOICE INDICATIONS USED ON ALARM TILES.	C2.7	6.3.3.4, SEE COMMENTS	156SS	VBD-R	DESIGN MOD.	II	FIX	1ST REFUELING	IDENTIFY THOSE MULTIPLE-CHOICE INDICATION ALARMS THAT ARE CRITICAL TO SAFETY. WHERE VISUAL INDICATORS NOT AVAILABLE ON THE PANEL TO VERIFY THE HIGH OR LOW INPUTS, ALARMS WILL BE SEPARATED TO SINGLE-CHOICE INDICATIONS.
423	ANNUNCIATORS WITH MULTIPLE TRIP LEVELS NOT PROVIDED WITH PARAMETER SETPOINTS.	C2.6	6.3.1.2, SEE COMMENTS	157SS	VBD-R	OTHER MOD	III	NO ACTION	NONE	ALARM SETPOINTS ARE IDENTIFIED ON ALARM PROCEDURES, LOCATED ON PANELS.
439	CONTROLS LOCATED OUTSIDE RECOMMENDED ZONES	A1.1	6.1.2	194SS	VBD-R	DESIGN MOD.	II	FIX-PER FEASIBILITY STDY RECOM	1ST REFUELING	INTEGRATE WITH HED 148SS. RELOCATE CONTROL AND ASSOCIATED DISPLAYS IN ACCORDANCE WITH NUREG 0700 ANTHROPOMETRIC LIMITS.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECOMD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
440	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	A3.7, SA3	6.4.2.2, 6.5.1.6, 6.6.6.4 &	195SS	VBD-R	DESIGN MOD.	II	FIX	1ST REFUELING	INTEGRATE WITH HED 194SS FOR POSSIBILITY OF RELOCATING CONTROLS & INDICATIONS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
445	LACK OF LABELS FOR IDENTIFYING SYSTEM DESIGNATION.	A5.3	6.6.1.1, 6.6.3.1, SEE COMMENTS	179SS	VBD-R	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELS IDENTIFYING SYSTEM DESIGNATION. CORRECT LABELS IDENTIFICATION.
450	INCONSISTENT TYPE STYLE AND APPLICATION OF TYPE SIZE.	A5.6	6.6.4.1, SEE COMMENTS	184SS	VBD-R	ENHANC.	A	FIX	1ST REFUELING	ENHANCEMENT IN AGREEMENT WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
458	INDICATORS NOT SCALED WITH SUBDIVISIONS IN DECIMAL MILTIPLES OF 1, 2 OR 5.	B2.1J	6.5.1.5	196SS	VBD-R	ENHANC.	B	FIX	1ST REFUELING	REPLACE SCALE IN ACCORDANCE WITH CNS HF STANDARDS AND NUREG 0700 GUIDELINES.
460	INDICATOR INFORMATION NOT EASILY READ.	B2.4	6.5.1.1, 6.5.2.2, SEE COMMENTS	82SS	VBD-R	ENHANC.	B	FIX	1ST REFUELING	EXAMINE INDICATORS AND DETERMINE COMPLIANCE OF INDICATOR DISPLAYED INFORMATION WITH CNS HF STANDARDS AND NUREG 0700.
470	ALARM WINDOW TILES ARE INCONSISTENT IN TYPE SIZE.	C2.2	6.3.3.4, 6.3.3.5, SEE COMMENTS	197SS	VBD-R	ENHANC.	B	FIX	1ST REFUELING	THE ANNUNCIATOR TILE IN QUESTION SHOULD BE ENHANCED TO CORRECT DEFICIENCIES IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG-0700 GUIDELINES.
471	LABELS ARE NOT SIZE CODED IN A HIERARCHICAL SYSTEM	A5.7	6.6.3.2, 6.6.3.3, 6.6.3.4 &	347SS	VBD-R	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
110	NO PHYSICAL DISTINCTION BETWEEN HANDLES. CODING BY SIZE, SHAPE, OR COLOR IS NOT BEING USED TO IDENTIFY SWITCH BY TYPE OF FUNCTION.	B*.1*	6.4.2.2 (SEE COMMENTS)	1105	VBD-S	ENHANC.	A	FIX	1ST REFUELING	FOLLOW STATION STANDARDS TO IDENTIFY TYPE OF CONTROL BY THE SHAPE OR COLOR BANDING OF THE HANDLES. DISTINGUISH BETWEEN PUMP & VALVE HANDLES.
138	ANNUNCIATORS NOT GROUPED ABOVE RELATED CONTROLS AND DISPLAYS.	C1.1 & C1.2	6.3.3.1, SEE COMMENTS	1285	VBD-S	DESIGN MOD.	II	FIX	1ST REFUELING	CORRECT THIS HED BY BRINGING THESE ANNUNCIATOR ALARMS CLOSER TO THE CONTROLS AND DISPLAYS ON ASSOCIATED PANELS.
164	ANNUNCIATOR RESPONSE CONTROLS NOT CODED FOR EASE OF RECOGNITION.	SC2	6.3.4.2, SEE COMMENTS	1645	VBD-S	ENHANC.	A	FIX	1ST REFUELING	INTEGRATE WITH HED 1825S. ENCLOSE THE CONTROLS WITH DEMARCATION LINES IN ACCORDANCE WITH CNS HF STANDARDS.
441	EXISTING LABELS ARE NOT CLEAR WITH RESPECT TO FUNCTION OR INTENT.	A5.10	6.6.2.1, 6.6.3.1, SEE COMMENTS	1755S	VBD-S	ENHANC.	A	FIX	1ST REFUELING	REVIEW LABEL CONTENT AND FABRICATE NEW LABELING THAT DESCRIBES FUNCTION OF THE TWO RED LIGHTS.
442	INCONSISTENT USE OF ACRONYMS AND ABBREVIATIONS	A5.5	6.6.3.2, 6.6.3.3, 6.6.3.4 a	1765S	VBD-S	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW LABELING CONSISTENT W/LABELING THROUGHOUT THE CTRL RM. CAUTION MUST BE EXERCISED TO ENSURE NO DISCREPENCIES ARE GENERATED BETWEEN NEW LABELS MADE & TERMINOLOGY FOUND IN PROCEDURES.
443	INDICATORS NOT MARKED TO SHOW NORMAL RANGES OF OPERATION.	B2.1	6.5.2.3 (SEE MISC/COMMENTS)	1775S	VBD-S	ENHANC.	B	FIX	1ST REFUELING	NORMAL RANGES OF OPERATION AND ENTRY CONDITIONS TO EMERGENCIES, AS SPECIFIED BY CNS EOP'S, WILL BE MARKED ON PRIMARY INDICATORS.
444	NUMBER OF GRADUATIONS BETWEEN NUMBERED MARKINGS ON SCALES EXCEED THE MAXIMUM OF NINE.	B2.12	6.5.2.5 (SEE MISC/COMMENTS)	1785S	VBD-S	ENHANC.	B	FIX	1ST REFUELING	REPLACE SCALES PER CNS STANDARDS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
446	ANNUNCIATOR NOMENCLATURE, ACRONYMNS, OR ABBREVIATIONS ARE NOT STANDARDIZED.	C2.1	6.3.3.4 (SEE COMMENTS)	180SS	VBD-S	ENHANC.	A	FIX	1ST REFUELING	FABRICATE NEW ANNUNCIATOR LEGEND TILES WHERE APPLICABLE IN ACCORDANCE W/STATION HUMAN FACTOR STDS & NUREG 0700 GUIDELINES. ENSURE THE UPDATE OF APPROPRIATE DWGS AND PROCEDURES. ENSURE OPERATOR AWARENESS OF ANY CHANGES IN TERMINOLOGY USED.
447	ANNUNCIATOR ALARMS ARE NOT PRIORITIZED FOR REQUIRED RESPONSE LEVEL BY LEGEND PLATE COLOR.	C2.8	6.3.1.4 (SEE MISC/COMMENTS)	181SS	VBD-S	ENHANC.	A	FIX	1ST REFUELING	IMPLEMENT PER CNS HUMAN FACTOR STANDARDS. A THREE-LEVEL PRIORITIZATION CODE BASED ON COLOR RED, AMBER & WHITE WILL FORM THE BASIS FOR ALARM PRIORITIZATION IN CNS CONTROL ROOM.
448	ALARM RESPONSE SYSTEM NOT CONSISTENT AMONG PANELS.	C5.5	6.3.4.2 (SEE MISC/COMMENTS)	182SS	VBD-S	DESIGN MOD.	II	FIX	1ST REFUELING	STANDARDIZE ALARM RESPONSE SYSTEMS AMONG ALL PANELS TO THE TRIANGULAR ARRANGEMENT OF CONTROLS USED ON BOP PANELS. "ACKNOWLEDGE" AND "RESET" PB's ON TOP ROW, AND TEST ON BOTTOM ROW. SEE CNS HF STANDARDS.
449	ASSOCIATION OF FEEDBACK TO RELATED CONTROLS NOT APPARENT THROUGH LABELING, MIMICS, DEMARCATION LINES.	A3.7,S A3,	6.4.2.2, 6.5.1.6, 6.6.6.4#	183SS	VBD-S	ENHANC.	A	FIX	1ST REFUELING	INTEGRATE WITH HED 173SS FOR POSSIBILITY OF RELOCATING CONTROLS & INDICATIONS TO PROVIDE NECESSARY ASSOCIATION OF CONTROLS AND FEEDBACK.
459	CONTROLS & DISPLAYS LOCATED OUTSIDE RECOMMENDED ZONES.	A3.6 & B5.3,	6.1.2	173SS	VBD-S	DESIGN MOD.	II	FIX	1ST REFUELING	RELOCATE CONTROLS AND DISPLAYS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS. FOR THOSE METERS THAT WILL NOT BE RELOCATED, UTILIZE TILTING OF DISPLAYS TO IMPROVE READABILITY.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.1- PANELS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
461	RELATED GROUPS OF CONTROLS OR DISPLAYS NOT SET OFF BY DEMARCATION LINES.	A2.3	6.6.6.1, 6.6.6.2, 6.8.1.7*	1745S	V80-S	ENHANC.	A	FIX	1ST REFUELING	ENHANCEMENT IN AGREEMENT WITH SPECIFIC STATION HUMAN FACTOR STANDARDS AND NUREG 0700 GUIDELINES.
462	EXTENSIVE TEMPORARY LABELS ARE BEING USED.	A6.1, A6.3	6.6.5.1, SEE COMMENTS	995S	V80-S	ENHANC.	A	FIX	1ST REFUELING	REVIEW SERVICES PRESENTLY BEING PROVIDED BY USE OF TEMPORARY LABELS. DETERMINE THEIR NECESSITY AND REPLACE WITH PERMANENT LABELS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
463	CONTROL SWITCH POSITION NOT PERMANENTLY MARKED.	B5.2	6.6.3.8	1855S	V80-S	ENHANC.	A	FIX	1ST REFUELING	PURCHASE OR FABRICATE NEW LEGEND LABELS WHICH REFLECT CONTROL POSITION. THE NEW LABELS SHOULD BE CONSISTENT WITH EXISTING LABELS IN TERMS OF COLOR, LETTER SIZE, TERMINOLOGY, SIZE AND LOCATION. ALL LABELS SHOULD BE PERMANENTLY ATTACHED.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
177	WATER LEVEL SCALE ON RECORDER PAPER DOES NOT MATCH INDICATED SCALE.	N/A	6.5.4.1, SEE COMMENTS	1T	9-5	ENHANC.	A	NONE, CORRECTION MADE*	MAY '85	*CHART PAPER REPLACED.
178	SCALE OF ONE RX PRESS INDICATION METER NOT IN AGREEMENT WITH THE REMAINING INDICATIONS.	N/A	6.5.1.5, SEE COMMENTS	2T	9-5	ENHANC.	A	NONE, CORRECTION MADE*	MAY '85	*METER SCALE REPLACED.
179	FRONT PANELS PRIMARY CONTAINMENT PRESS. RECORDERS NEED TO IDENTIFY NORMAL/OFF NORMAL RANGE OF OPERATION.	N/A	6.5.2.3	3T	9-3 & 9-4	ENHANC.	B	FIX*	1ST REFUELING	*COMBINE WITH HED 57S FOR PC-PR-1A, AND HED 265S FOR PC-PR-1B.
180	RX SCRAM INFORMATION IS INDICATED WHEN THE LIGHTS GO FROM 'LIT' TO 'OFF.'	N/A	6.5.3.1, SEE COMMENTS	4T	9-5	OTHER MOD.	III	NONE	NONE	NOT A PROBLEM. REDUNDANCY OF INDICATIONS BY BOTH CHANNELS A AND B LIGHTS, AND ASSOCIATED ALARMS ON THE SAME PANEL SUFFICE IN CONVEYING SCRAM INFORMATION TO THE OPERATOR. OPERATORS ARE TRAINED FOR THIS MODE OF INDICATION.
181	PRIMARY CONTAINMENT ISOLATION INFORMATION IS INDICATED WHEN THE LIGHTS GO FROM 'LIT' TO 'OFF.'	N/A	6.5.3.1, SEE COMMENTS	5T	9-5	OTHER MOD.	III	NONE	NONE	NOT A SERIOUS PROBLEM. REDUNDANCY OF INDICATIONS AVAILABLE SAME AS HED 4T.
182	FRONT PANEL METER INDICATION FOR MAIN STEAM RADIATION NOT AVAILABLE.	N/A	6.5.1.1	6T	N/A	OTHER MOD.	II	ADD TO PMIS/SPDS	2ND REFUELING	METER INDICATIONS AVAILABLE ON BACK PANELS 9-10 & 9-02.
183	RECORDER IDENTIFICATION LABEL MISSING.	N/A	6.6.1.1, 6.6.3.1	7T	9-02	ENHANC.	B	NONE, CORRECTION MADE*	NONE	*RECORDER LABELED.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
184	POSITIONS OF TCVs AND TSVs IN THE INTERMEDIATE RANGES OF FULLY OPEN AND FULLY CLOSED VALVE POSITIONS ARE INDICATED BY THE LIGHTS GOING 'OFF.'	N/A	6.5.3.1, SEE COMMENTS	8T	VBB-B	DESIGN MOD.	III	FIX	3RD REFUELING	REDUNDANT INDICATIONS AVAILABLE ON PANEL TO CONFIRM VALVE STATUS. HOWEVER, INCONSISTENCY EXISTS WITH OTHER VALVE CONTROLS WHERE DUAL LIGHT INDICATIONS ARE AVAILABLE WHEN VALVE IN MID-TRAVEL. CORRECTIONS SHOULD BE MADE TO RESOLVE THIS INCONSISTENCY.
185	SCRAM DISCHARGE VOLUME WATER LEVEL INDICATION NOT AVAILABLE.	N/A	6.5.1.1, SEE COMMENTS	9T	9-5	OTHER MOD	II	PLACE ON PMIS	2ND REFUELING	THE INTENTED PLAN TO REMEDY THIS HED IS TO PLACE THIS INDICATION ON THE PMIS/SPDS SYSTEM.
186	INTERMEDIATE RANGE MONITOR SWITCHES NEED COLOR MARKING IMPROVEMENTS.	N/A	6.4.4.4, 6.4.4.5, SEE COMMENTS	10T	9-5	ENHANC.	A	FIX	1ST REFUELING	BLACK AND RED MARKINGS ON IRM SWITCHES SHOULD BE MADE BOLDER AND BRIGHTER.
187	APRM TRIP SETPOINTS AT CORE FLOW LESS THAN 100% NOT DIRECTLY AVAILABLE (CALCULATIONS NECESSARY).	N/A	6.5.1.2	11T	9-5	OTHER MOD.	II	PLACE ON PMIS	1ST REFUELING	THE INTENDED PLAN TO REMEDY THIS HED IS TO HAVE THE SPDS/PMIS DISPLAY THIS INFORMATION, WHEN REQUESTED BY THE OPERATOR.
188	A SIGNAL INDICATING COMBINED OCCURRENCE OF RX SCRAM DEMAND AND APRM 2.5% (OR UNDETERMINED POWER LEVEL) IS NOT AVAILABLE.	N/A	6.5.1.1, 6.8.1.1, SEE COMMENTS	12T	9-5	OTHER MOD.	II	PLACE ON PMIS/SPDS	2ND REFUELING	THIS HED IS AN ENTRY CONDITION TO EMERGENCY FOR REACTOR CONTROL. A COMMITMENT HAS BEEN MADE TO PLACE ALL EOP ENTRY CONDITIONS ON THE PMIS/SPDS SYSTEM.
189	AN APRM VALUE OF 2.5% IS AT THE LOW-END OF THE SCALE, AND DIFFICULT TO READ.	N/A	6.5.2.3, SEE COMMENTS	13T	9-5	ENHANC.	A	FIX	1ST REFUELING	ENHANCE THE APRM RECORDER SCALES BY BOLDLY MARKING AND IDENTIFYING THE 2.5% MARK.
190	INFORMATION LIGHTS FOR SYSTEM ISOLATION DEMAND FOR GROUPS 2,3,6, AND 7 NOT AVAILABLE.	N/A	6.5.1.1, 6.8.1.1, SEE COMMENTS	14T	9-5	DESIGN MOD.	II	FIX	1ST REFUELING	PROVIDE INFORMATION LIGHTS FOR ISOLATION GROUPS 2,3,6 AND 7 SIMILAR TO GROUP 1 ISOLATION LIGHTS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
191	HPCI AND RCIC SYSTEM START ALARMS NEEDED.	N/A	6.5.1.1 *	15T	9-3 & 9-4	DESIGN MOD.	I	FIX	2ND REFUELING	INSTALL HPCI AND RCIC SYSTEM START ALARMS IN THE ALARMS BOXES ABOVE HPCI AND RCIC SUBSYSTEMS. ALARM UNIT COULD BE ADDED TO EITHER OF THE EXISTING SYSTEM FLOW LOOP OR TURBINE SPEED LOOP TO PERFORM SUCH FUNCTION.
192	RF PUMP DISCHARGE PRESSURE INDICATION HAS INCORRECT LABEL.	N/A	6.6.1.1, 6.6.1.1.2,SEE COMMENTS	16T	VBD-A	ENHANC.	A	NONE, CORRECTION MADE*	MAY '85	*LABEL REPLACED.
193	SLC TEST TANK LEVEL INDICATION NOT AVAILABLE.	N/A	6.5.1.1	17T	9-5	OTHER MOD.	I	NO ACTION REQUIRED*	NONE	*ATWS NEW DESIGN MODIFICATION UTILIZES A SEPARATE SUPPLY OF DEMINERALIZED WATER TO THE SLC PUMPS, TOTALLY BYPASSING THE SLC TANK. THEREFORE, TANK LEVEL INDICATION IS NOT NECESSARY.
194	RPV WIDE RANGE WATER LEVEL TREND RECORDING NOT AVAILABLE.	N/A	6.5.1.1	18T	9-3 & 9-4	DESIGN MOD.	I	INSTALL RECORDER	2ND REFUELING**	INTEGRATE WITH RG 1.97 WATER LEVEL INSTRUMENTATION. RECORDER DESIGN REQ'TS: RANGE -150 TO + 60 IN, ACC. 6.5%. OPERABILITY REQ'TS: RG 1.97 INSTRUMENTATION CATEGORY 1. DESIGN IS TO MEET CNS HF ENGINEERING STDS FOR VISUAL DISPLAYS.
195	WIDE RANGE TORUS PRESSURE RECORDER NOT AVAILABLE.	N/A	6.5.1.1	19T	9-3 & 9-4	DESIGN MOD.	I	FIX*	1ST REFUELING	*INTEGRATE WITH RG 1.97 PC PRESSURE INSTRUMENTATION. RECORDER DESIGN REQUIREMENTS: RANGE -5 TO 80 PSIG, ACC. 2% OPERABILITY REQUIREMENTS: RG 1.97 INSTR., CATEGORY 1. DESIGN IS TO MEET CNS HF ENGINEERING STANDARDS TO VISUAL DISPLAYS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
196	SRV LABEL IDENTIFICATION OUT OF SEQUENCE.	N/A	6.8.2.2,	20T	9-3	ENHANC.	A	FIX*	1ST REFUELING	*SAME HED IDENTIFIED BY CONTROL ROOM SURVEY (HED 3SS)
197	FUNCTIONAL SEPARATION BETWEEN ADS & LLS VALVES NOT EVIDENT	N/A	6.6.6.2 (SEE COMMENTS)	21T	9-3	ENHANC.	A	FIX	1ST REFUELING	SEPARATE BETWEEN ADS AND LLS VALVES THROUGH USE OF LINES OF DEMARCATION.
198	NO DIRECT READING OF RX SUB-CRITICALITY AVAILABLE.	N/A	6.5.1.1, SEE COMMENTS	22T	9-5	OTHER MOD.	II	EOP TRAINING	1ST REFUELING	THE EXISTING METHOD OF DETERMINING CRITICALITY AND SUBCRITICALITY IS BY OBSERVATION AND CALCULATION OF THE START-UP RANGE MONITORS AND PERIOD METERS. TRAIN OPERATORS FOR OBSERVING VARIOUS PARAMETERS TO VERIFY SUB-CRITICALITY.
199	ALTERNATE SYSTEM FOR BORON INJECTION (OTHER THAN SLC) NOT PRESENTLY IN PLACE.	N/A	N/A	23T	9-5	OTHER MOD.	I	NO ACTION REQUIRED*	NONE	*REVISED EOPS UTILIZE REACTOR WATER CLEAN UP PUMPS, TIED TO THE SLC TANK, AS AN ALTERNATE SYSTEM FOR BORON INJECTION. SYSTEM HARDWARE IS IN PLACE.
200	LOW-END OF THE SCALE ON SRM RECORDERS NOT IDENTIFIED.	N/A	6.5.1.5, SEE COMMENTS	24T	9-5	ENHANC.	A	FIX	MAY '85	IDENTIFY SCALE GRADUATIONS IN ACCORDANCE WITH NUREG 0700 GUIDELINES.
201	NO DIRECT READOUT OF RX COOLDOWN RATE AVAILABLE.	N/A	6.5.1.1, SEE COMMENTS	25T	9-21	OTHER MOD.	III	PLACE ON PMIS	2ND REFUELING	ANALYSIS OF OPERATOR TASKS IS RECOMMENDED FOR ESTABLISHING OPERATOR INFORMATION REQUIREMENTS. VISUAL DISPLAYS SHOULD PROVIDE ALL THE INFORMATION ABOUT SYSTEM STATUS & PARAMETER VALUES NEEDED TO MEET TASK REQUIREMENTS IN NORMAL AND EMERG. SITUATIONS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
202	SUPPRESSION POOL BULK TEMPERATURE INDICATION NOT DIRECTLY AVAILABLE (CALCULATIONS REQUIRED).	N/A	4.5.1.1, SEE COMMENTS	26T	VBD-J	OTHER MOD.	II	PLACE ON SPDS	2ND REFUELING	ENTRY CONDITIONS TO EMERGENCY, AS SPECIFIED IN THE EOPs, WILL BE DISPLAYED ON THE SPDS.
203	LABEL MARKING OF GROUP I ISOLATION RESET SWITCHES NEEDS IMPROVEMENT.	N/A	6.6.1.1, 6.6.3.1, SEE COMMENTS	27T	9-5	ENHANC.	A	FIX	1ST REFUELING	FABRICATE A NEW LABEL IN AGREEMENT WITH SPECIFIC STATION STANDARDS AND NUREG 0700 GUIDELINES. ENSURE LABEL TERMINOLOGY MATCHES THAT OF PROCEDURES TO PREVENT CONFUSION.
204	ROD SEQUENCE CONTROL SWITCH LABEL NEEDS IMPROVEMENT.	N/A	6.6.1.1, 6.6.3.1, SEE COMMENTS	28T	9-5	ENHANC.	A	FIX	1ST REFUELING	FABRICATE A NEW LABEL IN AGREEMENT WITH SPECIFIC STATION STANDARDS AND NUREG 0700 GUIDELINES. ENSURE LABEL TERMINOLOGY MATCHES THAT OF PROCEDURES TO PREVENT CONFUSION.
205	STANDBY LIQUID CONTROL (SLC) TANK LEVEL INDICATION IS DIFFICULT TO READ AT 1% LEVEL	N/A	6.5.2.3, SEE COMMENTS	29T	9-5	ENHANC.	A	FIX	1ST REFUELING	PLACE A FINE DEMARCATION LINE AT 1% LEVEL.
206	MANUAL SWITCHES FOR ACTUATING RELAYS FOR REOPENING MSIV'S NOT AVAILABLE.	N/A	N/A	30T	9-17	DESIGN MOD.	I	FIX	1ST REFUELING	DESIGN A SPECIAL TOOL FOR REOPENING MSIV's. MODIFY EOP's
207	SCRAM DISCHARGE VOLUME ALARM TILE DOES NOT MATCH ALARM PROCEDURE.	N/A	6.3.3.4, SEE COMMENTS	31T	9-5	ENHANC.	A	NONE, CORRECTION MADE**	MAY'85	**ALARM TILE LABEL REPLACED AND PROCEDURES CHANGED.
208	CONCERN REGARDING NOT ENOUGH PHONES TO ACCOUNT FOR FAILURE OF COMMUNICATION BETWEEN RX BUILDING AND CONTROL ROOM.	N/A	6.2	32T	N/A	DESIGN MOD.	II	FIX	2ND REFUELING	INSTALL PHONES & SYSTEM.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
209	POSITION LOCK SWITCHES FOR CS, RHR, AND RCIC TO PREVENT AUTOMATIC INITIATION NOT AVAILABLE.	N/A	6.4.1.2	33T	9-3 & 9-4	DESIGN MOD.& PROC. REVIEW	II	FIX	1ST REFUELING	INSTALL LOCKING SYSTEM AND ASSOCIATED ALARMS TO INFORM OPERATOR OF CS, RHR'S, AND RCIC AUTOMATIC INITIATION INHIBIT.
210	POINTER OF FUEL ZONE INDICATION TOO WIDE - COVERS SCALE.	N/A	6.5.2.2, (SEE COMMENTS)	34T	9-3	ENHANC.	A	NO ACTION	NONE	METER HAS BEEN REPLACED.
211	RHR SERVICE WATER PUMP CONTROLS AND INDICATIONS ARE LOCATED ON BACK PANELS RATHER THAN PANEL 9-3.	N/A	6.5.1.1, 6.9.1, (SEE COMMENTS)	35T	9-3	DESIGN MOD.	II	FIX	1ST REFUELING	INSTALL PUMP CONTROLS ON PANEL 9-3.
212	FRONT PANEL SP TEMPERATURE ALARM NOT AVAILABLE.	N/A	6.5.1.1, SEE COMMENTS	36T	VBD-J	DESIGN MOD.	II	FIX	1ST REFUELING	RELOCATE ALARM ON FRONT PANEL. WITH THE RHR (SP) COOLING CONTROLS LOCATED ON THE 9-3 PANEL, ALARM SHOULD BE PLACED IN ANNUNCIATOR BOX 9-3-1 OR 9-3-4.
213	DRYWELL BULK TEMPERATURE IND. NOT DIRECTLY AVAILABLE (CALCULATIONS REQUIRED).	N/A	6.5.1.1, SEE COMMENTS	37T	VBD-H	OTHER MOD.	II	PLACE ON PMIS/SPDS	2ND REFUELING	DRYWELL BULK TEMPERATURE CALCULATIONS ARE DOCUMENTED IN THE EOPS. THIS INFORMATION WILL BE MADE DIRECTLY AVAILABLE TO THE OPERATOR THROUGH THE PMIS/SPDS.
214	DW BULK TEMPERATURE ALARM NOT AVAILABLE & LOCAL ALARMS LOCATED ON BACK PANELS.	N/A	6.3.1.2, SEE COMMENTS	38T	VBD-H	DESIGN MOD.	II	FIX	2ND REFUELING	PLACE ALARM ON FRONT PANEL. IDENTIFY EOPs ENTRY CONDITION ON SPDS.
215	SP LEVEL ALARM UTILIZES COMMON ANNUNCIATOR FOR BOTH HIGH & LOW LEVELS.	N/A	6.3.3.4	39T	9-3	OTHER MOD.	III	NO ACTION	NONE	SAME DISCREPANCY IDENTIFIED IN CR SURVEY (HED 2255). NO ACTION IS NECESSARY. INDICATIONS TO VERIFY ALARMS ARE LOCATED ON SAME PANEL.

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216	INCORRECT DEMARCATION OF ALARM SETPOINTS ON SP LEVEL INDICATION.	N/A	6.5.2.3, SEE COMMENTS	40T	9-3	ENHANC.	A	FIX	1ST REFUELING	REMOVE EXISTING ALARM MARKS (TAPE) AND REMARK THE METER IN AGREEMENT WITH SPECIFIC STATION STANDARDS AND NUREG 0700 GUIDELINES.
217	ALARM PROCEDURES FOR PANELS P1 & P2 SPECIFYING PC HYDROGEN CONCENTRATION SETPOINTS AND OPERATOR ACTIONS NOT AVAILABLE.	N/A	6.3.4.3, SEE COMMENTS	41T	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	PROCEDURE CHANGE OF EOPs PRIMARY CONTAINMENT HYDROGEN CONTROL REQUIRED. ALARM SETPOINTS SHOULD BE IN ACCORDANCE WITH EOPs ENTRY CONDITION.
218	PC HYDROGEN CONCENTRATION ALARMS AND INDICATIONS ARE LOCATED ON BACK PANELS.	N/A	6.3.3.1	42T	VBD-P1&P2	OTHER MOD.	II	PLACE ON SPDS	3RD REFUELING	IT WOULD BE BENEFICIAL TO THE OPERATORS TO HAVE FRONT PANEL INDICATION, THIS INFORMATION COULD EASILY BE PROVIDED ON THE PMIS/SPDS SYSTEM.
219	INCORRECT SCALE ON PC HYDROGEN CONCENTRATION RECORDER (SHOULD READ 0-5% NOT 0-100%)	N/A	6.5.1.2, SEE COMMENTS	43T	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	REVIEW THE HYDROGEN ANALYSER OUTPUT WHICH FEEDS THIS RECORDER. VERIFY THE SIGNAL CORRESPONDS TO A SPAN OF GAS DETECTION OF 0-5% INSTEAD OF 0-100%.
220	DW COOLING FAN SWITCHES LOCATED 19" FROM THE FLOOR.	N/A	6.1.2.5	44T	VBD-H	DESIGN MOD.	II	FIX*	2ND REFUELING	*SAME DISCREPANCY IDENTIFIED IN CR SURVEY. RELOCATE CONTROLS IN ACCORDANCE WITH THE RECOMMENDATION OF THE FEASIBILITY STUDY PERFORMED ON PANEL MODIFICATIONS.
221	TORUS AIR TEMPERATURE RECORDER LOCATED 30" FROM THE FLOOR.	N/A	6.12	45T	VBD-J	DESIGN MOD.	II	FIX+	1ST REFUELING	+SAME HED IDENTIFIED IN CR SURVEY (HED 18655)
222	LABEL DIFFERENTIATION BETWEEN SP AND DW SYSTEM SPRAYS NEEDED.	N/A	6.6.3.4,	46T	9-3	ENHANC.	A	FIX*	1ST REFUELING	* SAME HED IDENTIFIED IN CR SURVEY (HED 855).

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
223	NPSH FOR PUMPS TAKING SUCTION FROM SP AT VARIOUS WLs NOT AVAILABLE.	N/A	N/A	47T	N/A	OTHER MOD.	II	MODIFY PROC.	1ST REFUELING	THE EOP SHOULD BE MODIFIED TO GIVE SEVERAL NPSH CURVES AT SP VARIOUS LEVELS.*
224	INDICATIONS FOR THE "2D" PC LIMITS OF SP TEMP. AND RX PRESSURE NOT IN CLOSE PROXIMITY.	N/A	6.5.1.1	48T	N/A	OTHER MOD.	II	PLACE ON SPDS	2ND REFUELING	PLACE ALL EOPs TWO-DIMENSIONAL PC LIMITS ON SPDS. (REFER TO HED 26T FOR MAKING SP BULK TEMP. AVAILABLE ON SPDS).
225	TORUS NARROW RANGE PRESSURE INDICATION HAS AN INCORRECT SCALE.	N/A	6.5.1.2	49T	VBD-J	ENHANC.	A	FIX*	1ST REFUELING	*SAME HED IDENTIFIED IN CR SURVEY (HED 68S)
226	SBGT AND ACAD INTERFACE FOR VENTING THE PC NEEDS A MIMIC AND IDENTIFICATION OF FLOW PATH.	N/A	6.6.6.4, SEE COMMENTS	50T	VBD-P1&P2	ENHANC.	B	FIX	3RD REFUELING	ENHANCEMENT SHOULD BE PERFORMED IN TERMS OF MIMICS AND DEMARCATION LINES IN AGREEMENT WITH THE CNS CONTROL ROOM HUMAN FACTORS ENGINEERING GUIDELINES AND NUREG 0700.
227	THE "2D" PC LIMITS OF HEAT CAPACITY TEMP. LIMIT VERSUS SP WL REQUIRES PERFORMING CALCULATIONS. INDICATIONS FOR INPUT PARAMETERS NOT IN CLOSE PROXIMITY.	N/A	6.5.1.1, SEE COMMENTS	51T	N/A	OTHER MOD.	II	PLACE ON SPDS	2ND REFUELING	PLACE ALL EOPs TWO-DIMENSIONAL PC LIMITS ON SPDS
228	RECORDER SCALE RANGE OF DRYWELL ATMOSPHERIC OXYGEN CONCENTRATION NOT INDICATED - NEEDS TO CALL TO KNOW RANGE.	N/A	6.5.1.1, SEE COMMENTS	52T	VBD-H	DESIGN MOD.	III	FIX	2ND REFUELING	PERFORM NECESSARY DESIGN MODIFICATIONS TO DISPLAY THE SCALE RANGE TO THE OPERATOR.
229	INDICATION LIGHTS OF SAMPLING LOCATIONS OF THE DRYWELL ATMOSPHERIC OXYGEN CONCENTRATIONS NOT BRIGHT ENOUGH.	N/A	6.5.3.1, 6.5.3.2, SEE COMMENTS	53T	VBD-H	DESIGN MOD.	III	FIX	2ND REFUELING	INTEGRATE WITH HED 52T. VERIFY THE INTENSITY OF INDICATING LIGHT RELATIVE TO NUREG 0700 AND FIX ACCORDINGLY.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
230	LIMITING CONDITIONS OF OPERATION (LCO) RADIOACTIVITY RELEASE RATE NOT READILY AVAILABLE. (CALCULATIONS REQUIRED).	N/A	6.5.1.1	54T	N/A	OTHER MOD.	II	PLACE ON PMIS/SPDS	2ND REFUELING	RADIOACTIVE RELEASE RATE CALCULATIONS WILL BE MADE AVAILABLE THROUGH THE SPDS/PMIS CLASS 'A' DOSE ASSESSMENT MODEL.
231	ACTION LEVELS ON SP TEMPERATURE AND LEVEL AND, RX LEVEL AND PRESSURE NEED TO BE MARKED.	N/A	6.5.2.3.	55T	9-3 & 9-4	ENHANC.	B	FIX*	1ST REFUELING	* DUPLICATE. IDENTICAL TO HED 57S, FROM CRS.
232	NO FUNCTIONAL LABEL FOR SECONDARY CONTAINMENT AREA TEMPERATURE INDICATION METER.	N/A	6.6.1.1	56T	9-21	ENHANC.	B	FIX	2ND REFUELING	FABRICATE NEW LABEL. SAME DISCREPANCY IDENTIFIED IN CR SURVEY (HED 1665S)
233	SC AREA TEMPERATURE INDICATION METER LOCATED ABOVE LINE OF SIGHT.	N/A	6.1.2	57T	9-21	DESIGN MOD.	II	FIX	2ND REFUELING	INTEGRATE WITH HED 1585S IN RELOCATING METER INDICATIONS TO MEET THEANTHROPOMETRIC LIMITS
234	SC HVAC EXHAUST RADIATION METERS A&B LOCATED 15" FROM THE FLOOR.	N/A	6.1.2.5N /A	58T	9-10 & 9-11	DESIGN MOD.	II	FIX	2ND REFUELING	SAME DISCREPANCY IDENTIFIED IN CR SURVEY (HED 55). FIX ACCORDING TO FEASIBILITY STUDY RECOMMENDATIONS.
235	ALARM SETPOINTS ARE TEMPORARILY PLACED BELOW SC AREA RADIATION INDICATION METERS.	N/A	6.6.5.1	59T	9-10 & 9-11	ENHANC.	B	FIX	2ND REFUELING	REPLACE BY PERMANENT LABELS. DISCREPANCY ALSO IDENTIFIED IN CR SUVEY (HED 395)
236	PROCESS UNITS NOT IDENTIFIED ON SC AREA RADIATION RECORDER.	N/A	6.5.1.4	60T	9-02	ENHANC.	B	FIX	2ND REFUELING	IDENTIFY PROCESS UNITS ON FACE OF RECORDER. SAME DISCREPANCY NOTED IN CR SURVEY (HED 1295).
237	CHART PAPER OF SC AREA RADIATION RECORDER DOES NOT MATCH RECORDER SCALE.	N/A	6.5.4.1	61T	9-02	ENHANC.	A	ACTION COMPLETED*	MAY'85	*CHART PAPER WAS REPLACED.

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238	RECORDER CONTAINS EXCESSIVE PLOTS - NO SINGLE TREND CAN EASILY BE DISTINGUISHABLE.	N/A	6.5.4.1, 6.5.4.2,	62T	9-02	DESIGN MOD.	II	FIX	2ND REFUELING	TO ALLEVIATE THIS HED WILL PROBABLY REQUIRE REDUCING THE NUMBER OF INPUTS TO A RECORDER BY PROVIDING ADDITIONAL RECORDERS. IF SCALE IS A PROBLEM, IT IS POSSIBLE TO PURCHASE SPLIT SCALE RECORDERS.
239	SECONDARY CONTAINMENT (SC) SUMPS' WATER LEVEL INDICATIONS NOT AVAILABLE.	N/A	6.5.1.1, SEE COMMENTS	63T	VBD-S	DESIGN MOD.	I	FIX	1ST REFUELING	PROVIDE SUMPS' WL INDICATIONS. RANGE TO COVER EOP REQUIREMENTS + 20%. OPERABILITY REQUIREMENTS OF INSTRUMENTS ARE SAME AS CATEGORY 2 OF RG 1.97 INSTRUMENTATION.
240	ALARM FOR SECONDARY CONTAINMENT TORUS AREA LEVEL, AS AN ALERT TO EMERGENCY, NOT AVAILABLE.	N/A	6.5.1.1, SEE COMMENTS	64T	VBD-S	DESIGN MOD.	I	FIX	1ST REFUELING	PROVIDE TORUS AREA LEVEL ALARM, WITH A SETPOINT CONSISTENT WITH EOP ENTRY CONDITIONS.
241	DIRECT INDICATION OF SECONDARY CONTAINMENT SUMP PUMPS' DISCHARGE NOT AVAILABLE.	N/A	6.5.1.1	65T	VBD-S	OTHER MOD.	III	NO ACTION	NONE	HED 63T SUMP LEVEL INSTALLATION WILL PROVIDE NECESSARY INDICATION OF SYSTEM FUNCTIONAL OPERATION. NO ADDITIONAL ACTION REQUIRED.
242	SC HVAC CONTROLS AND DISPLAYS NOT SET OFF BY DEMARCATION LINES.	N/A	6.6.6.2	66T	VBD-R	ENHANC.	B	FIX*	1ST REFUELING	*INTEGRATE WITH HED 1485S. VBD-R SHOULD BE ENHANCED IN TERMS OF DEMARCATION LINES IDENTIFYING FUNCTIONALLY RELATED CONTROLS AND DISPLAYS. CHANGES SHOULD BE PERFORMED IN AGREEMENT WITH SPECIFIC CNS STATION STANDARDS AND NUREG 0700 GUIDELINES.

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243	RANGE (50-170F) OF AREA TEMPERATURE INDICATIONS FOR CS, RHR's, AND HPCI DO NOT EXTEND TO EMERGENCY LIMITS (ALERT SIGNAL 200F)	N/A	6.5.1.1, 6.5.1.2, SEE COMMENTS	677	VBD-R	DESIGN MOD.	I	FIX	1ST REFUELING	REVIEW EXISTING HARDWARE TO DETERMINE IT IS CAPABLE OF BEING CALIBRATED TO NEW DATA. IF THIS IS TRUE ONLY METER SCALES WILL BE REPLACED. IF NOT, THEN A COMPLETE DESIGN CHANGE WILL BE REQUIRED. IMPLEMENTATION SCHEDULE DICTATED BY LONG LEAD TIME.
244	DIRECT INDICATION OF SC HVAC FAN FLOW NOT AVAILABLE.	N/A	6.5.1.1 *	687	VBD-R	DESIGN MOD.	III	FIX	1ST REFUELING	RE-ANALYZE THE EXISTING SYSTEM INSTRUMENTATION OF START/STOP IL'S AND VARIOUS TEMPERATURE ELEMENTS TO ENSURE THE NEED FOR DIRECT FLOW INDICATION. FIX ACCORDINGLY.
245	SMALL PRINT ON ALARM TILE FOR OFFGAS EFFLUENT MONITOR	N/A	6.3.3.4, 6.3.3.5, SEE COMMENTS	697	9-4	ENHANC.	A	NONE, CORRECTION MADE*	MAY '85	* TILE REPLACED.
246	OFF-GAS VENT PIPE INDICATION METERS LOCATED 24" FROM THE FLOOR.	N/A	6.5.2.2	707	9-02	DESIGN MOD.	II	FIX	2ND REFUELING	INTEGRATE WITH HED 31755 FOR PERFORMING THE DESIGN MODIFICATIONS TO IMPROVE THE LOCATION OF THE RECORDER.
247	LOCATION OF FUNCTIONAL LABELS OF OFF-GAS VENT PIPE INDICATION METERS ARE INCONSISTENT (SOMETIMES ABOVE OR BELOW METER).	N/A	6.6.2.1	717	9-02	ENHANC.	B	FIX	2ND REFUELING	RELOCATE LABELS IN ACCORDANCE WITH CNS HF STANDARDS.
248	OFF-GAS VENT PIPE RECORDER POINTER COVERS READING ON SCALE.	N/A	6.5.2.2	727	9-02	ENHANC.	B	FIX	2ND REFUELING	RAISE SCALE OR REPLACE POINTER. SAME DISCREPANCY IDENTIFIED IN CR SURVEY (HED 31855).

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249	INCONSISTENT FUNCTIONAL LABELING BETWEEN METER AND RECORDER FOR SERVICE WATER RADIATION MONITOR.	N/A	6.6.3.6, 6.6.3.7,	73T	9-02	ENHANC.	B	FIX	2ND REFUELING	REVIEW OF THE EXISTING LABELS SHOULD BE PERFORMED TO DETERMINE WHICH LABEL BEST CONVEYS THE INTENDED MEANING. CORRECTIONS SHOULD BE MADE IN AGREEMENT WITH THE CNS CTRL HF STANDARDS AND IMPLEMENTATION GUIDELINES.
250	SERVICE WATER RADIATION RECORDER POINTER COVERS READING ON SCALE.	N/A	6.5.2.2	74T	9-02	ENHANC.	B	FIX	2ND REFUELING	SAME HED IDENTIFIED IN CR SURVEY (HED 31855).
251	RADIATION RELEASE MONITOR RECORDER PAPER SCALE DOES NOT MATCH INDICATED VTL. SCALE.	N/A	6.5.4.1, SEE COMMENTS	75T	VBD-Q43	ENHANC.	B	FIX	1ST REFUELING	CHART PAPER AND SCALE REPLACEMENT IS IN PROGRESS. ENSURE AN EQUIPMENT SPECIFICATION CHANGE IS SUBMITTED IDENTIFYING THE NEW CHART PAPER PART NUMBER.
252	CNS DOSE RATE ASSESSMENT REQUIRES PERFORMING CALCULATIONS.	N/A		76T	N/A	OTHER MOD.	II	PLACE ON PMIS	2ND REFUELING	A BACKUP METHOD AVAILABLE. OPERATOR USES A PROGRAMMED CALCULATOR.
253	SITE BOUNDARY DOSE RATE NOT DIRECTLY AVAILABLE - REQUIRES COMMUNICATION WITH HEALTH PHYSICS (HP).	N/A	6.5.1.1	77T	NONE	OTHER MOD.	II	PLACE ON SPDS/PMIS	2ND REFUELING	PLANT PROCEDURES PROVIDES CALCULATIONS OF SITE BOUNDARY DOES RATE BASED ON HEALTH PHYSICS (HP) INPUT.

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254	OPERATORS EXPRESS A SERIOUS NEED FOR INTEGRATED PLANT TRAINING.	N/A	N/A	11	N/A	OTHER MOD.	III	INSTALL	4TH REFUELING	PROVIDE PLANT SPECIFIC SIMULATOR TRAINING.
255	LACK OF VENTILATION SYSTEM SUPPLY FILTRATION	N/A	6.1.5	21	N/A	DESIGN MOD.	III	INSTALL FILTERS	2ND REFUELING	REVIEW THE EFFICIENCY OF THE EXISTING FILTRATION SYSTEM. IF NOT POSSIBLE TO ALLEVIATE THIS HED BY INCREASING PERIODIC CLEANING OR REPLACEMENT OF FILTER, THEN NEW FILTERS WOULD HAVE TO BE INSTALLED.
256	LACK OF AN AVAILABLE BACKUP COOLING SUPPLY FOR THE CONTROL ROOM AIR CONDITIONING SYSTEM	N/A	6.1.5, SEE COMMENTS	31	N/A	DESIGN MOD.	III	INSTALL	2ND REFUELING	THE CLIMATE CONTROL SYSTEM SHOULD BE CAPABLE OF MAINTAINING TEMPERATURE AND HUMIDITY WITHIN THE SHADED AREA COMFORT ZONE SHOWN IN EXHIBIT 6.1-21 (SEE PAGE 6.1-44 IN NUREG 0700 GUIDELINES.
257	SRM RAMP SWITCH IS TOO SMALL FOR HOLD FOR 90 SECONDS IN SURVEILLANCE POSITION NEED AN OPERATOR AID.	N/A	6.4.4.5, SEE COMMENTS	41	9-5	DESIGN MOD.	II	FIX	1ST REFUELING	THE SRM RAMP SWITCH SHOULD BE REPLACED WITH A MORE SUITABLE TYPE OF CONTROL SWITCH. A CHANGE OF THIS NATURE WILL REQUIRE A DESIGN CHANGE.
258	RFP MINIMUM FLOW VALVE CONTROL SWITCH INSTALLED BACKWARDS (TURN TO RIGHT TO CLOSE)	N/A	6.4.2.1, SEE COMMENTS	51	VBD-A	DESIGN MOD.	II	FIX	3RD REFUELING	SAME DISCREPANCY IDENTIFIED IN CR SURVEY (HED 7755). THE EXISTING SWITCH SHOULD BE REVISED OR REPLACED SO THAT CONTROL MANIPULATION IS CONSISTENT WITH OTHER CONTROLS AND IN AGREEMENT WITH STATION STANDARDS AND NUREG 0700 GUIDELINES.

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259	THE RPS POWER SUPPLY LIGHTS ARE OPPOSITE THEIR RESPECTIVE POSITIONS ON THE TRANSFER SWITCH.	N/A		61	9-16	DESIGN MOD.	II	FIX	2ND REFUELING	MAY NEED SWAPPING OF LIGHTS & REDO TAG.
260	MAIN TURBINE SEALING STEAM LABEL DESCRIPTION VAGUE AND UNCLEAR.	N/A	6.6.3.1, 6.6.3.2, SEE COMMENTS	71	VBD-B	ENHANC.	A	FIX	1ST REFUELING	A NEW LABEL SHOULD BE FABRICATED. ENSURE APPROPRIATE PROCEDURES ARE UPDATED REFLECTING CHANGE IN TERMINOLOGY WHERE APPLICABLE.
261	SBGT DAMPER: POSITIONS ARE "NORMAL" AND "HAND". "NORMAL" IS ACTUALLY THE NOT NORMAL LINEUP.	N/A	6.6.3.1, 6.6.3.2*	81	VBD-K	ENHANC.	B	FIX	2ND REFUELING	A NEW LABEL SHOULD BE FABRICATED IN AGREEMENT WITH CNS STATION STANDARDS AND NUREG 0700 GUIDELINES.
262	CONTROL ROD DRIVE WATER DELTA PRESSURE GAGE HAS NON-STANDARD INCREMENTS.	N/A	6.5.1.5	91	9-5	DESIGN MOD.	II	FIX	1ST REFUELING	SAME DISCREPANCY IDENTIFIED IN CONTROL ROOM SURVEY (HED) . REPLACE WITH STANDARD INCREMENTS METER SCALE, IN ACCORDANCE WITH CNS HF STANDARDS.
263	NEED FOR LOW RANGE METER FOR ACCURATE OPERATOR CONTROL OF BLOWDOWN.	N/A	6.5.1.2, SEE COMMENTS	101	9-4	DESIGN MOD.	II	FIX	1ST REFUELING	REVIEW EXISTING INSTR TO DETERMINE NEED FOR EXISTING SCALE. IF SO A NARROW RANGE INSTR LOOP SHOULD BE INSTALLED INDEPENDENT OF WIDE RANGE LOOP. IF DETERMINED THAT EXISTING INSTR ARE TOO WIDE OF RANGE IT MAY BE POSSIBLE TO RECALIBRATE TO NARROWER SPAN
264	RHR 2/3 CORE HEIGHT LEVEL PERMISSIVE MANUAL OVERRIDE SWITCH LABEL CONFUSING.	N/A	6.6.3.1, (SEE COMMENTS)	111	9-3	ENHANC.	A	FIX	1ST REFUELING	NEW LABEL SHOULD BE FABRICATED IN AGREEMENT WITH CNS STATION STANDARDS AND NUREG 0700 GUIDELINES. ENSURE APPROPRIATE PROCEDURES ARE UPDATED REFLECTING CHANGE IN TERMINOLOGY WHERE APPLICABLE.

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265	GLAND SEAL STEAM PRESSURE GAGE RANGE TOO LARGE FOR NORMAL OPERATION.	N/A	6.5.1.2, SEE COMMENTS	121	VBD-B	DESIGN MOD.	II	FIX	2ND REFUELING	DETERMINE IF THE EXISTING SCALE IS REQUIRED. IF SO, A NARROW RANGE INSTRUMENT LOOP SHOULD BE INSTALLED INDEPENDENT OF THE WIDE RANGE LOOP. IF DETERMINED THAT THE EXISTING INSTRUMENTS ARE TOO WIDE OF RANGE THEN RE-CALIBRATE TO A NARROWER SPAN.
266	NO DIRECT REACTOR WATER LEVEL INSTRUMENTATION ON PANEL 9-3	N/A	N/A	131	9-3	DESIGN MOD.	III	INSTALL	1ST REFUELING	INTEGRATE WITH HED 18T&151 FOR INSTALLING WIDE RANGE/FUEL ZONE WL RECORDER THAT COVERS THE RANGE FROM NORMAL WL TO BOTTOM OF CORE. RECORDER READING SHOULD YIELD DIRECT WL IN THE RPV, REFERENCED TO TOP OF ACTIVE FUEL.
267	LACK OF DIGITAL INDICATORS FOR REACTOR PRESSURE AND REACTOR LEVEL (ON PANEL 9-5 ABOVE TOP OF FUEL MATRIX).	N/A	N/A	141	9-5	DESIGN MOD.	II	INSTALL	2ND REFUELING	INTEGRATE WITH HED 18T, 121, 151.
268	LACK OF DIRECT ACCIDENT WATER LEVEL INDICATION.	N/A	6.5.1.1	151	9-3	DESIGN MOD.	II	FIX	2ND REFUELING	INTEGRATE WITH HED 18T&131 AND RG 1.97 WL INSTRUMENTATION. NPPD WILLIMPLEMENT A PROGRAM OF COOLING THE WL REFERENCE LEG OR RELOCATING IT OUTSIDE THE DW. THIS WILL RESULT IN DISPLAYING A DIRECT WL IN THE CNTRL RM UNDER ACCIDENT CONDITIONS.
269	COMPUTERIZED TECH.SPECS NEEDED	N/A	6.5.1.1	161	N/A	OTHER MOD.	III	PLACE ON PMIs	2ND REFUELING	UTILIZE KEYWORD SEARCH.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
165	EACH VOLUME OR BINDER DOES NOT HAVE AN INDEX OR TABLE OF CONTENTS.	E2.3	N/A	165S	N/A	OTHER MOD./PROCESURES	III	FIX	1ST REFUELING	TABLE OF CONTENTS IDENTIFYING PROCEDURE NUMBERS AND TITLES WILL BE INCLUDED IN EACH OF THE PROCEDURE BINDERS.
166	INDEX TABLING SYSTEM WITHIN EACH PROCEDURE BINDER NOT CONVENIENT TO USE.	E2.6	N/A	166S	N/A	OTHER MOD./PROCEDURES	III	FIX	1ST REFUELING	COMBINE WITH HED 165S.
167	NO ADMINISTRATIVE PROCEDURE IN USE TO ASSURE STANDARDIZATION OF PROCEDURE FORMAT FOR TYPE STYLE, NOMENCLATURE, AS-LABELED DESIGNATION OF COMPONENTS ENTRY/EXIT CONDITIONS, OR IDENTIFICATION OF REVISION.	E3	N/A	167S	N/A	ENHANC.	B	FIX	1ST REFUELING	A NEW PROCEDURE, WRITER'S GUIDE HAS BEEN WRITTEN BY THE STATION. THIS GUIDE WILL ADDRESS THIS HED.
168	SETPOINTS AND SENSOR IDENTITY NOT PROVIDED IN EMERGENCY AND ABNORMAL PROCEDURES.	E4.14	N/A	168S	N/A	OTHER MOD.	I	FIX	2ND REFUELING	ALARMS AND SETPOINTS WILL BE IDENTIFIED AS SYMPTOMS IN ABNORMAL AND EMERGENCY PROCEDURES.
169	PROCEDURES DO NOT PROVIDE CONTINGENCY ACTIONS IF EXPECTED RESULTS ARE NOT ACHIEVED UNDER DEGRADED CONDITIONS.	E4.16	N/A	169S	N/A	OTHER MOD.	I	PROVIDE ALTERNATIV E	NONE	EOPs WILL COVER THIS DISCREPANCY.
170	APPLICABLE REVISION OF CROSS-REFERENCES NOT IDENTIFIED.	E5.2	N/A	170S	N/A	OTHER MOD.	III	NO ACTION	NONE	ONLY LATEST REVISIONS OF PROCEDURES AVAILABLE IN THE CR. LATEST REVISIONS ARE VERIFIED BY COMPUTER.
171	PROCEDURE INDEX OR TABLE OF CONTENTS NOT UPDATED TO SHOW LATEST REVISION.	E6.9	N/A	171S	N/A	OTHER MOD.	III	NONE	N/A	LATEST REVISION OF THE PROCEDURES IS KEPT ON FILE IN THE CONTROL ROOM. TABLE OF CONTENTS WILL NOT LIST THE REVISION NUMBER.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMEN-TATION ACTION	SCHEDULE	RESOLUTION/NOTES
607	LIMITED STORAGE SPACE FOR PROCEDURES AND REFERENCE MATERIAL.	E1.5	N/A	333SS	N/A	ENHANC	II	FIX	1ST REFUELING	IMPROVE THE SPACE FOR STORING THE PROCEDURES AND EXPAND THE LAYOUT SPACE FOR REFERENCE MATERIAL.
608	LIMITED LAY DOWN SPACE FOR USE OF PROCEDURES AND REFERENCE MATERIALS AT THE PANELS.	E1.7	N/A	334SS	N/A	ENHANC.	II	FIX	1ST REFUELING	UTILIZE EITHER A ROLLING TRAY OR A SLIDING CART ON THE NEW PANEL RAILING SYSTEM TO PROVIDE LAY DOWN SPACE FOR THE PROCEDURES AT THE PANELS.
609	EACH PROCEDURE SHOULD BE CLEARLY MARKED IN THE BINDER OR FOLDER.	E2.2	N/A	335SS	N/A	ENHANC.	II	DONE, HED RESOLVED*	1ST REFUELING	*PROCEDURE BINDERS HAVE BEEN NUMBERED AND MARKED.
610	EMERGENCY PROCEDURES SHOULD BE IN A SEPARATE BINDER OR FOLDER.	E2.4	N/A	336SS	N/A	ENHANC.	II	DONE, CORRECTION MADE*	MAY 1985	*EMERGENCY PROCEDURES HAVE BEEN PLACED IN SEPARATE BINDERS WITH SPECIFIC COLOR CODING IDENTIFYING THEM AS EPs.
611	EQUIPMENT AND ADMINISTRATIVE LIMITS FOR OPERATION SHOULD BE LISTED.	E4.15	N/A	337SS	N/A	ENHANC.	II	FIX	2ND REFUELING	A TWO-YEAR PROCEDURE UPGRADE PROGRAM WILL BE CONDUCTED AT THE STATION. INCLUSION OF EQUIPMENT AND ADMINISTRATIVE LIMITS WILL BE CONSIDERED AS PART OF THIS PROGRAM.
612	REFERENCE MATERIAL IDENTIFIED IN THE PROCEDURES ARE NOT CONVENIENTLY LOCATED.	E5.1	N/A	338SS	N/A	ENHANC.	II	FIX	1ST REFUELING	COMBINE WITH HED 333SS.
613	NO CONTROLLED METHOD IN PLACE TO ADDRESS OPERATORS ADDITION TO THE CR PANELS.	E6.10	N/A	339SS	N/A	ENHANC.	II	FIX	2ND REFULEING	AN ADMINSTRATIVE PROCEDURE WILL BE WRITTEN TO ADDRESS MINOR ADDITIONS TO THE CR PANELS. MAJOR ADDITIONS ARE ADMINISTRATIVELY CONTROLLED BY DESIGN CHANGES.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.3- ENVIRONMENT & COMMUNICATIONS

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
172	COMMUNICATION SYSTEM NOT REDUNDANT.	F1.1	6.2	172S	N/A	DESIGN MOD.	II	FIX	2ND REFUELING	A NEW SYSTEM IS BEING INSTALLED.
173	THE PA SYSTEM HAS NO CHANNEL DEDICATED TO OPERATIONS.	F1.4	6.2	173S	N/A	DESIGN MOD.	II	FIX	2ND REFUELING	REFER TO HED 172S
174	COMMUNICATION SYSTEM NOT EQUIPPED WITH CHANNEL SELECT.	F1.7	6.2,	174S	N/A	DESIGN MOD.	II	FIX	2ND REFUELING	REFER TO HED 172S.
614	COMMUNICATION TO IN-PLANT NOISE AREAS NOT EASILY ACCESSIBLE.	F1.5	6.2	340SS	N/A	DESIGN MOD.	II	FIX	2ND REFUELING	CONSIDER INSTALLING FLASHING LIGHTS IN NOISE AREAS FOR NOTIFYING PERSONNEL TO CONTACT THE CR. A HEARING PROTECTOR ENCLOSURE SHOULD BE INSTALLED IN EACH OF THE NOISE AREAS TO FACILITATE COMMUNICATION.
615	INDISTINGUISHABLE AUDIBLE SIGNALS BETWEEN FRONT AND BACK PANELS.	F2.1	6.1	341SS	N/A	DESIGN MOD.	II	FIX	2ND REFUELING	EQUIP BACK PANEL WITH DIFFERENT TONE ALARMING SYSTEM.
616	PRIORITIZATION OF AUDIBLE SIGNALS.	F2.2	6.1	342SS	N/A	OTHER MOD.	III	NO ACTION	NONE	PRIORITIZATION OF AUDIBLE SIGNALS IS NOT DESIRED. DEPENDING ON THE SPECIFIC ALARM AND EXISTING PLANT CONDITIONS, THE OPERATOR WILL RESPOND.
617	INADEQUATE EMERGENCY LIGHTING AT ALL PANEL SURFACES.	F6.8	6.1.5.4, SEE COMMENTS	343SS	N/A	DESIGN MOD.	I	FIX	3RD REFUELING *	PERFORM THE NECESSARY DESIGN MODIFICATIONS TO IMPROVE THE EMERGENCY LIGHTING IN THE CONTROL ROOM.
618	BACKGROUND NOISE LEVEL SLIGHTLY ABOVE LIMIT. ROUTINELY PROVIDE NOISE LEVEL BELOW AN INTERFERENCE LEVEL FOR NORMAL CONVERSATION. MEASURE IN BOTH dbA (MAXIMUM 65) AND dbC AT EACH OPERATING AREA.	F7.1	6.1.5.5, SEE COMMENTS	344SS	N/A	OTHER MOD.	III	NO ACTION	NONE	THE HIGHEST NOISE LEVEL IN THE CONTROL IS 70 dB IN THE AREA AROUND THE PRINTER. THIS PRINTER IS BEING REPLACED BY A NEW QUIETER PRINTER CONNECTED TO THE PMIS.

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
619	COMMUNICATIONS SYSTEMS NOT SUBJECTED TO PERIODIC MAINTENANCE TESTS.	SF1.1	6.2.1.1	34555	N/A	ENHANC.	II	FIX	2ND REFUELING	MAINTENANCE TESTING BETWEEN CR-TSC-EOF WILL BE ADDED TO THE PREVENTIVE MAINTENANCE LIST.
620	CR COMMUNICATIONS EQUIPMENT NOT IN WELL MARKED LOCATIONS.	SF1.2	6.2.1	34655	N/A	ENHANC.	II	FIX	2ND REFUELING	EQUIP THE CR WITH SUFFICIENT EXTENSION CORDS AND LOCATE THEM IN SPECIFICALLY MARKED PLACES.

APPENDIX D
1. CONTROL ROOM SURVEY RESULTS AND ASSESSMENT
1.4- MAINTENANCE AND SURVEILLANCE & TRAINING AND MANNING

RECORD NO.	HED DESCRIPTION	CHECK-LIST ITEM	NUREG-0700 SECTION	HED ID.	PANEL ID.	ENHANCEMENT / MODIFICATION	CATEGORY / PRIORITY	IMPLEMENTATION ACTION	SCHEDULE	RESOLUTION/NOTES
175	CONTROL ROOM OPERATOR MAINTENANCE AND SURVEILLANCE FUNCTIONS, RESPONSIBILITIES NOT CLEARLY ESTABLISHED.	G1.1	N/A	1758	N/A	ENHANC.	B	FIX	1ST REFUELING	IMPROVE DIVISION OF RESPONSIBILITIES.
176	GUIDELINES DEFINING DUTIES AND RESPONSIBILITIES OF SHIFT MEMBERS DURING EMERGENCY CONDITIONS ARE VERY GENERAL.	H2.3	N/A	1765	N/A	ENHANC.	A	FIX	1ST REFUELING	REVIEW THE EXISTING PROCEDURES AGAINST NUREG 0737 GUIDELINES

APPENDIX E

CNS CONTROL ROOM HUMAN FACTORS ENGINEERING STANDARDS AND IMPLEMENTATION GUIDELINES

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REVISION 0

COOPER NUCLEAR STATION

CONTROL ROOM HUMAN FACTORS ENGINEERING

STANDARDS AND IMPLEMENTATION GUIDELINES

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CONTENTS

1. INTRODUCTION

During the period extending from May to December 1984 a detailed control room design review (DCRDR) was conducted in compliance with NRC requirements. This review identified a number of opportunities for enhancing the Cooper Nuclear Station control room from the human factors engineering standpoint. In January 1985 an enhancement and modification program was initiated to correct Human Engineering Deficiencies (HEDs) revealed by the DCRDR review. The present document presents human factors engineering standards and implementation guidelines for enhancing the control room both in the near term and for subsequent changes to the control room over the operational life of the plant.

Each major topical area covered in this document first provides a statement of the general objectives for enhancement. This statement is followed by a discussion of enhancement principles derived from NUREG-0700, EPRI research, and the general body of human factors engineering literature. The third part of each section delineates standards and implementation guidelines tailored specifically to the Cooper Nuclear Station, recognizing special limitations and constraints imposed by the control room design as it presently exists and the history of operational experience. Finally, each section is concluded with a list of references that supplement the guidance offered in this document.

It is obvious that some valid human engineering design principles cannot reasonably be applied on a backfit basis due to a concern for negative transfer of operational experience, i.e., previously learned operator responses could lead to operational errors if backfits were implemented. In other cases, a specific enhancement might overly disrupt the present design and incur penalties that outweigh the benefits.

Implementation of enhancement standards presented in this document requires a systematic, coordinated process as shown in Figure 1-1.

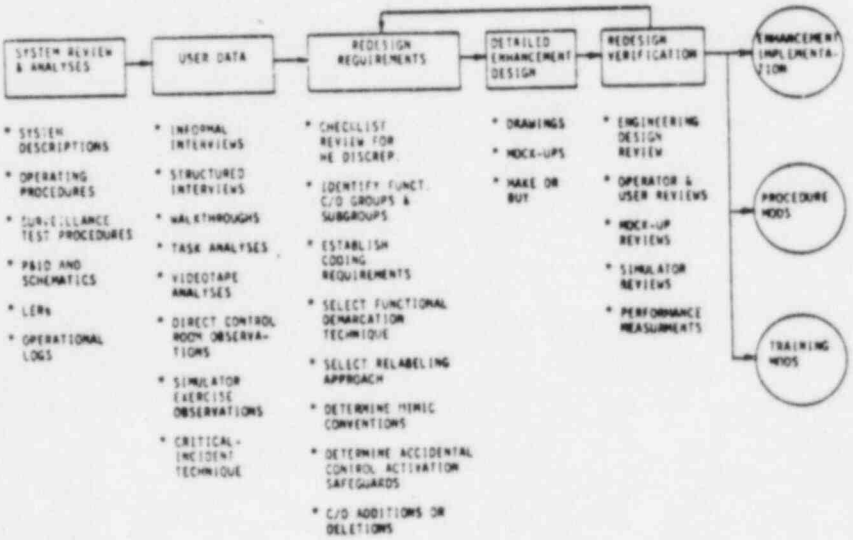


FIGURE 1-1. SYSTEMATIC ENHANCEMENT METHODOLOGY

Enhancement efforts should be initiated with a detailed review of the system or subsystem panel or console under consideration. This entails a review of system description documents, operating procedures, surveillance test procedures, P&IDs and schematics, operator logs and the history of LERs associated with the console under scrutiny. The next step is to obtain an understanding of operator tasks associated with the console. This is accomplished by one on more of the following techniques: informal interviews, structured interviews, walkthroughs, task analyses, observations of operator performance in the control room and detailed analyses of operator errors on near mishaps (critical-incident technique).

The foregoing efforts will serve as the basis for backfit or redesign requirements. The standards presented in this document are then applied in attempting to meet identified requirements. A half or full-scale mockup of the existing configuration at this point becomes a highly useful tool for developing and evaluating detailed enhancement designs. The mockup can be developed using existing drawings of "as is" panel configurations, as available, or by means of photographic representations of existing configurations.

When detailed enhancements and modifications are implemented on a trial basis on the mockup it is necessary to conduct a redesign verification before the proposed changes are implemented in the control room. A redesign verification program should include engineering design reviews, operator reviews, and human factors reviews to ensure that proposed backfits will not be counterproductive.

After the proposed enhancements are verified they should be implemented in the control room in a manner and at a time that least disrupts ongoing control room operations. Concurrent with planning for control room backfits, attention should be given to ensuring that operating procedures and operator training programs are updated to coincide with changes made in the control room.

2. PANEL LAYOUT

2.1 GENERAL OBJECTIVE

Control panels should be designed so that the relationships between control and display elements are logical and are made explicit to the operator. Human engineered control panel arrangements provide the following advantages:

1. Minimize operator training time.

2. Minimize probability of control misidentification or of reading the wrong display.

3. Increase comprehension of system interrelationships, especially during stressful periods.

4. Decrease time required for correctly diagnosing system anomalies and for making appropriate corrective responses.

2.2 PANEL LAYOUT PRINCIPLES

A well designed control panel should observe the following principles:

1. Sequential Activities - Where controls and displays are addressed in a fixed sequence of operations, they should be arranged from left-to-right or top-to-bottom in the required sequence.

2. Importance and Frequency-Of-Use - Where practical, the most important and the most frequently used panel elements should be given preferential treatment in terms of reach and visual access.

3. Right-Hand Operation - Since 90% of the operators are right-handed, controls requiring a high degree of manual dexterity should be located for right-hand operation as the operators address the panels.

4. Functional Grouping - Functionally related groupings of panel elements should be provided to permit an understanding of control-display interrelationships. Mirror-imaging of functional groups should not be used, and any recurring functional groups should be replicated.

5. Mimic Arrangements - The interrelationships between panel elements can sometimes be made explicit by adding graphics to show system components, flow paths, and control-display associations.

In considering the foregoing panel layout principles for enhancement purposes, it is important to note that there will be very limited opportunities for changing the location of existing panel components. The cost of moving components is very high considering the associated documentation factors. Furthermore, overall system reliability may be compromised when it is necessary to disrupt and reconfigure associated circuitry. Consequently, the layout principles described above must generally be superimposed on existing panel arrangements. These limitations do not permit us, for example, to reorganize panels to further right-handed operations. However, it is often possible to add markings to the panels to highlight functional groupings, to provide mimic flows, and to add cues as to the appropriate sequence of control operations.

2.3 ENHANCEMENT STANDARDS AND IMPLEMENTATION GUIDELINES

The sequential steps required to enhance control panel layouts are as follows:

1. Analyses - In conjunction with control room operators, develop an in-depth understanding of the normal and emergency task sequences performed on the panel in question.

2. Operating Experience - Review past operating experience with the panel by interviewing operators regarding operating difficulties, near mishaps, and LERs. Training instructors, as available, can

also offer important insights into the problems experienced by trainees with respect to the panel under scrutiny.

3. Select Applicable Panel Layout Enhancement Approach - Based on the present arrangement of panel elements and the nature of required operator tasks, determine whether a mimic presentation or functional demarcation approach can be applied for enhancement purposes. Operators generally prefer mimic arrangements where possible. However, when the original layout is too compact or where a more or less random presentation of panel elements is offered, or where there are multiple alternative paths, a mimic might prove overly complex or convoluted to be of any real value. In such cases, functional demarcation may offer the best prospect for enhancement.

4. Functional Demarcation Methods - Based on the analysis of panel element inter-relationships (Step 1 above) determine logical major system groupings, subpanel groupings, and further groupings within subpanels. Use raised plastic blue lines to demarcate major system groupings, e.g., RCIC, HPCI. Use automotive pinstriping (of the same color), 1/4 inch wide, to demarcate subpanel areas. Further demarcation lines within subpanel areas should be blue, 1/8 inch automotive pinstriping. Figure 2-1 summarizes these recommended dimensions and gives an indication of major system, subpanel, and within subpanel grouping criteria. Figures 2-2 and 2-3 show a comparison of undemarcated and demarcated panel arrangements. Note that the subpanel groupings are further set apart by angled, rather than squared, corners. In comparing Figures 2-2 and 2-3 also note that a hierarchical labeling scheme (as described in Section 6) complements the functional demarcation enhancement approach.

5. Mimic Layout Methods - Based on the analysis of panel inter-relationships and operator tasks (Step 1 above) establish primary and secondary flow paths and the sequence of operator actions for all modes of operation. First connect panel elements relating to the primary flow path with lines constructed by use of 3/16 inch automotive pinstriping. Then connect secondary or bypass flow

FIGURES 2-1. RECOMMENDED DEMARCATION LINE WIDTHS

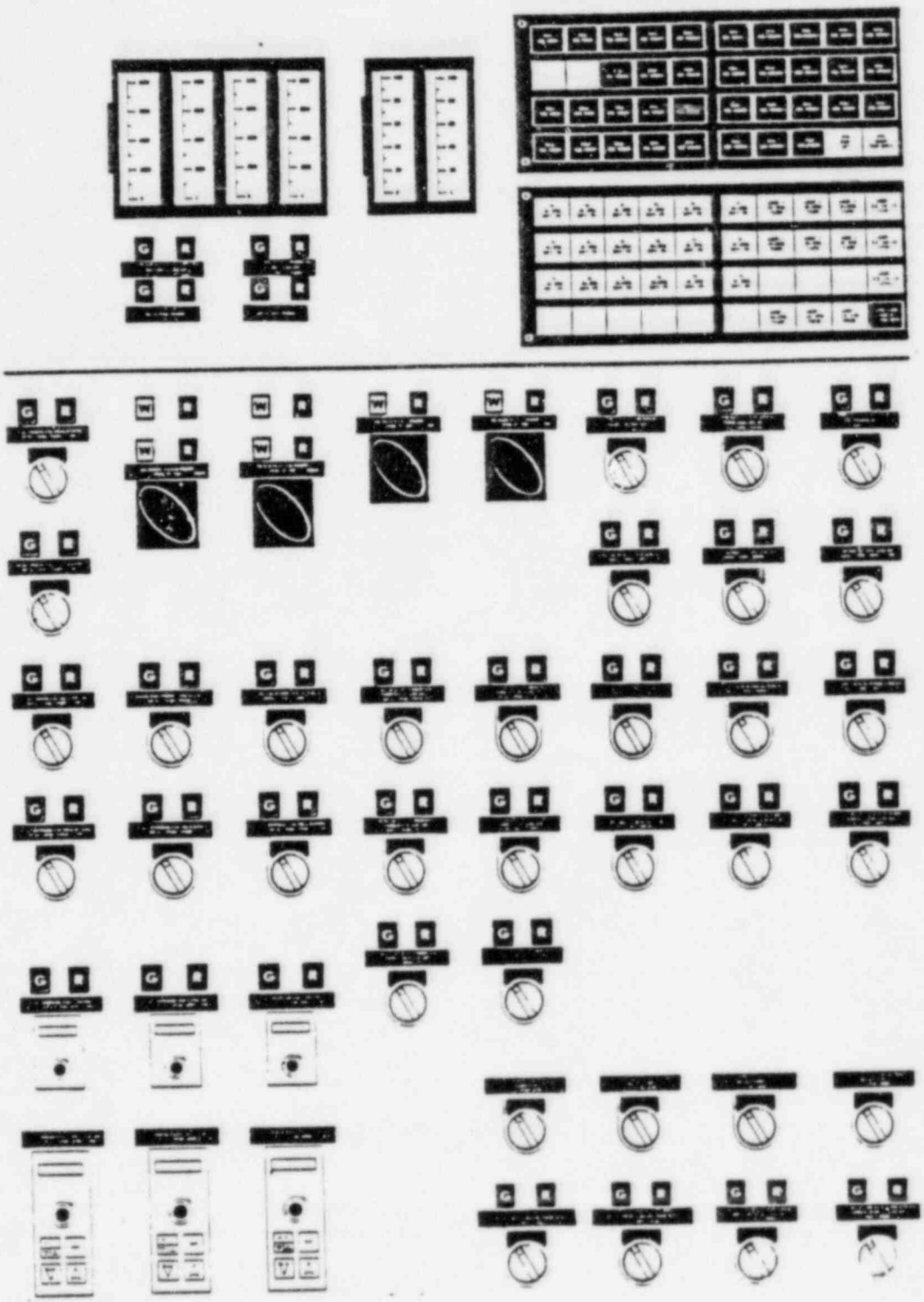


FIGURE 2-2. UNDEMARCATED CONTROL PANEL. NOTE THE DIFFICULTY IN DISCERNING INTERRELATIONSHIPS BETWEEN PANEL ELEMENTS

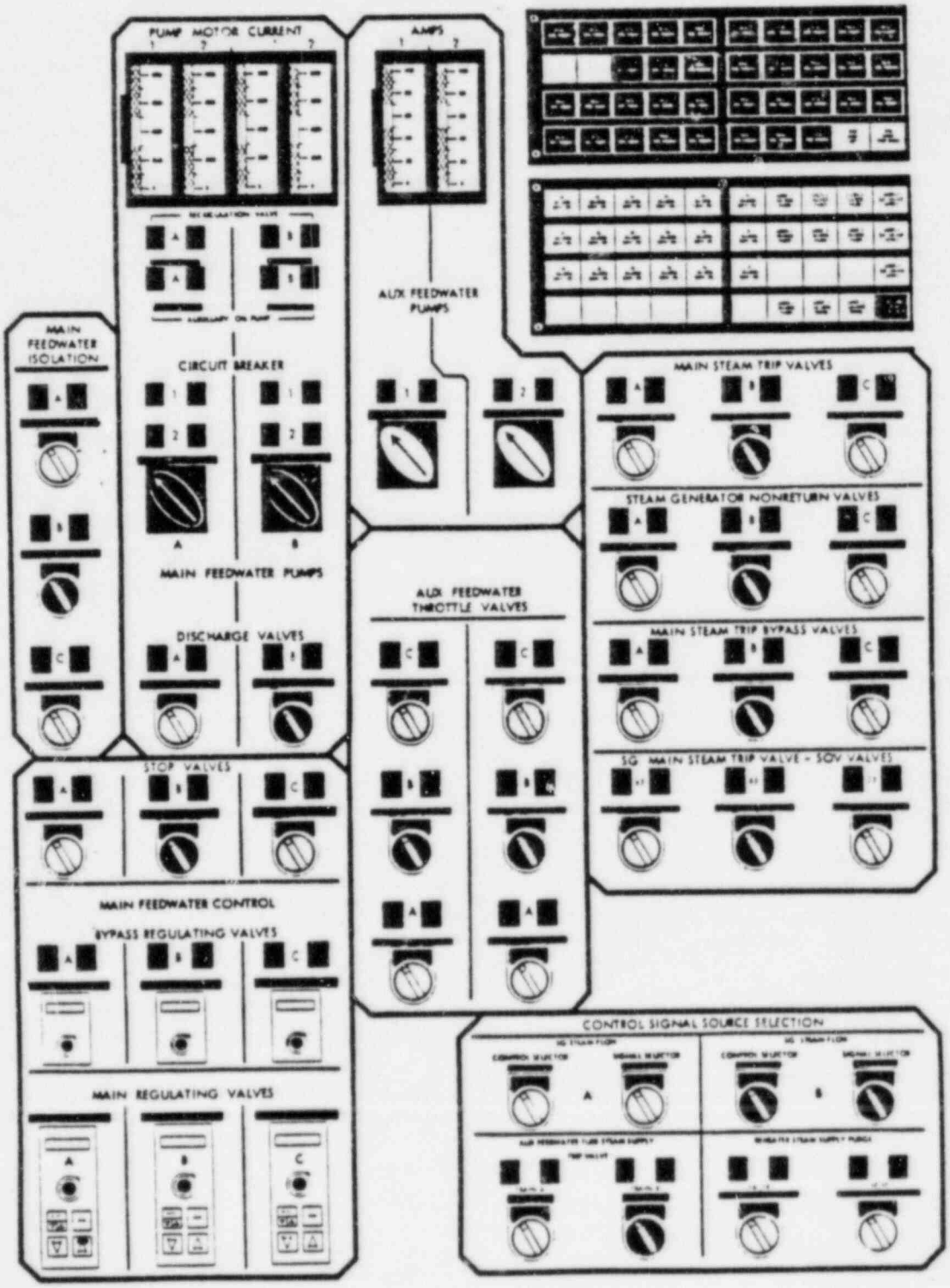


FIGURE 2-3. DEMARCATED PANEL TO REVEAL SUBGROUPINGS. NOTE THAT NO PANEL ELEMENTS HAVE BEEN MOVED IN COMPARING THIS FIGURE WITH FIG. 2-2.

paths with narrower lines; 1/8 inch automotive pinstriping. Employ color coding of lines in accordance with coding conventions offered in Table 2.1 (observe the different conventions used for the electrical buses, panel VBD-C). To further differentiate primary and secondary paths, primary flow path lines should have a 1/8" dashed line running along the center of the 3/16 inch pinstriping. This dashed line should be of contrasting color, e.g., white dashes on red or dark blue dashes on light blue lines.

Avoid overlapping mimic lines. Flow directions should be clearly indicated by distinctive arrow heads. Label origin and terminal points of the mimic. Use graphic symbols to represent system components, where space permits, that are readily understood by operators and conform to standard symbols used on P&IDs. Figure 2-4 illustrates the mimics conventions described above.

6. Miscellaneous Cueing Techniques - where the existing organization of panel elements does not permit effective functional demarcation or mimic arrangements without excessive relocation of panel elements, other cueing approaches may be applied as expedients.

For example, prominent numerals can be affixed to controls to indicate the sequence of required operator responses. Where alternative response patterns may exist in relation to a given panel arrangement, the numerals can be color coded to distinguish the alternate response modes. This color coding can be extended to control knobs and the bezels of associated displays. Such approaches are not as effective as functional demarcation or mimic techniques and should only be employed as a last resort.

TABLE 2-1

COLOR CODING CONVENTIONS FOR MIMICS

System	Color Convention
Demarcation Lines	Dark Blue
Steam Lines	Red
Primary Flow Path	Light Blue with Thin Dark Blue Dashed Lines
Test Lines	Light Blue, Same Thickness as Primary Path
Min. Flow Bypass Lines	Light Blue, Thin Lines
Nitrogen Lines	Yellow
Air Lines	Light Brown
RHR SDC Mode of Operation	Dark Brown
RHR Pool Cooling	Dark Green
RHR Torus & DW Sprays	Yellowish Green

System (Electrical Buses)	Color Convention
- 345 KV Offsite Switch Yard to Normal Station Service Transformer	Black
- 161 KV Line To 4160V Startup Station Transformer	Green
- 69 KV Critical Bus To 4160 V Emergency Station Service Transformer	Red
- Normal Power Supply To Station & D/G	Light Brown

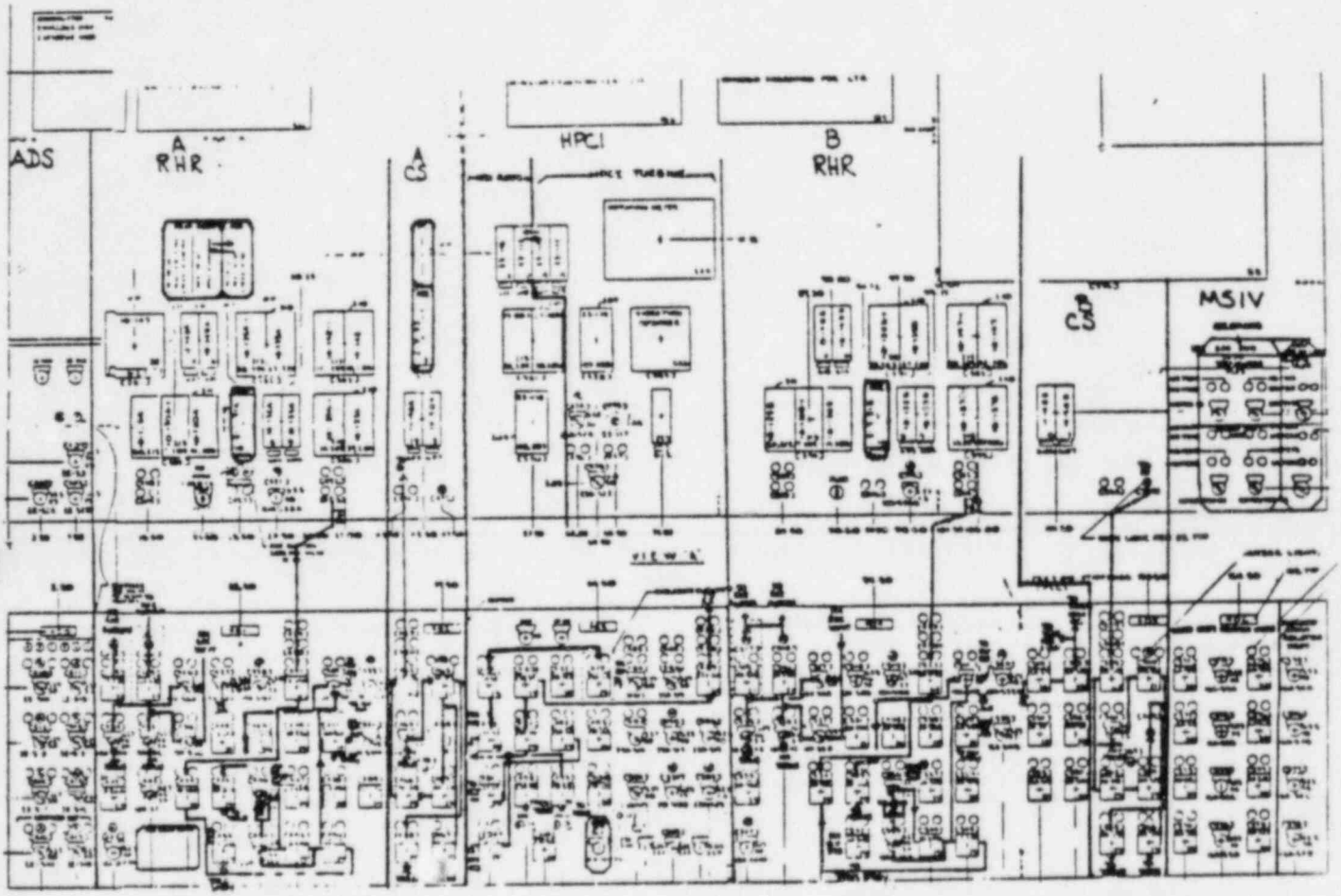


FIGURE 2-4. MIMIC CONVENTIONS APPLIED TO PANEL 9-3.

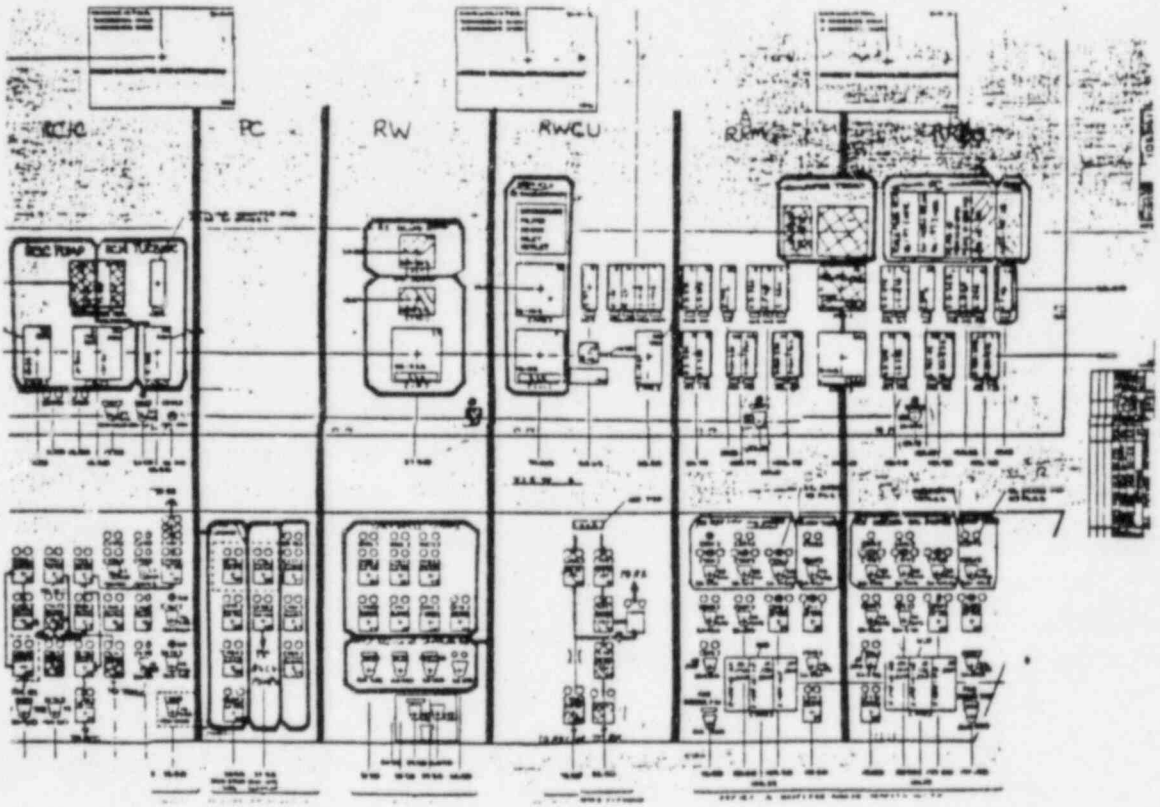


FIGURE 2-4B MIMIC CONVENTIONS APPLIED TO PANEL 9-4

2.4 REFERENCES

Further data relating to panel layout enhancements is available in the following references:

1. NUREG-0700, Guidelines For Control Room Design Reviews, Nuclear Regulatory Commission, August 1981.

2. EPRI NP-2411, Human Engineering Guide for Enhancing Nuclear Control Rooms, May 1982.

3. EPRI NP-3659, Human Factors Guide for Nuclear Power Plant Control Room Development, August 1984.

4. EPRI NP-1118, Human Factors Methods for Nuclear Control Room Design - Vol.I: Human Factors Enhancement of Existing Nuclear Control Rooms, Nov.1979.

3. CONTROLS

3.1 GENERAL OBJECTIVE

All controls should ensure ease of operation and should be suitable for operator use in the control room. Each control should be the appropriate type for the function it performs. Controls should be selected, coded, located, and guarded in a manner that minimizes the possibilities for accidental or inadvertant operation.

3.2 CONTROL DESIGN PRINCIPLES

The following design principles permit operators to manipulate the controls with minimum operator errors. The selection of controls should consider the following factors:

1. Direction Of Movement - To minimize operator error, control movements shall conform to the following population stereotypes:

	Component	Function	Control Action
A.	Pump & Fans	Start	Right, Clockwise
		Auto, Normal	Center
		Stop	Left, Counterclockwise
		Pull to lock	Extreme left counter-clockwise and pull out
B.	Valve & Dampers	Open	Right, Clockwise
		Normal	Center
		Auto	Center
		Close	Left, Counterclockwise
C.	Circuit Breakers	Close	Right, Clockwise
		Auto, Normal	Center
		Trip	Left, Counterclockwise
		Pull to lock	Extreme left counter-clockwise and pull out
D.	Control Rod Drive Position	In	Up
		Out	Down

2. Actuation Force - All controls should be provided with resistance (e.g., friction or spring - loaded, so that distinct or sustained effort is required for actuation. However, actuation force should not cause operator discomfort or prompt the use of "cheaters."

3. Durability - Controls should be sufficiently rugged to withstand normal use. Each control should retain its appearance, feel, and functional characteristics during its service life. Controls should not develop internal looseness, binding or backlash.

4. Coding Of Controls - The use of coding methods (e.g., color, size and shape) should be governed by the relative advantages and disadvantage of each type of coding. For example, size and location coding may improve visual identification, yet may also require extra board space. When coding is used to differentiate among controls, application of the coding should be uniform throughout the control room. Shape coding is the preferred coding method.

5. Control Visibility - The control pointer should be clearly visible to the operator from his normal operating position. Similarly, the label which identifies the control and control option labels should be easily readable from the normal operating position.

6. Preventing Accidental Activation - Controls should be located and oriented so that the operator is not likely to strike or move them accidently in any sequence of control movements. Accidental activitation of controls should be minimized by one or more of the following methods:

   A. Controls may be recessed, shielded, or otherwise surrounded by physical barrers. The control shall be entirely contained within the barrier.

B. Controls may be covered or guarded with movable (e.g., hinged) barriers. When the guard is in the open position, it shall not interfere with the operation of the guarded control or other adjacent controls. Safety or lock wires shall not be used.

C. Controls may be provided with interlocks which require an extra movement (e.g., pull-to-lock) or prior operation of a related or locking control.

D. When a strict sequential activation is necessary, controls should be provided with locks to prevent the controls from passing through a position. Further movement shall require a new control action.

7. Securing Against Activiation By Unauthorized Personnel - Key-operated controls should be used when system requirements dictate that the function being controlled should be secured against activation by unauthorized personnel. Key-operated switches should not be used solely as a means of shape coding.

8. Indication of Control Activation - To ensure that the operator knows that a control has been activitated, a positive indication should be provided. This could be in the form of snap feel, an audible click or an integral light for pushbutton controls. For rotating switches, a position indication should be provided in the form of a pointer feature.

9. Control Operation Characteristics - The operational characteristics of controls should be made obvious to operators. For example, selector knobs for spring-loaded momentary contacts should be differentiated from those associated with fixed - detent selector switches. Similarly, pushbutton indicators should be differentiated from simple indicators with no control features.

10. Standarized Control Option Placement - The arrangement of control options should be logical and consistent from control to control. For example, the Auto position should consistently be at the 12 o'clock position and CLOSE/OPEN options should consistently be left-to-right.

3.3 ENHANCEMENT STANDARDS AND IMPLEMENTATION GUIDELINES

1. Control Coding - Shape coding conventions were established in the original design of the control boards. Existing conventions are summarized in Table 3-1. Each panel should be reviewed to ensure that the original shape coding conventions are being observed consistently. In reviewing the shape coding conventions provided in Table 3-1 it is apparent that controls can be further differentiated. Pistol grip controls are used for both pumps and seal-in valves. Similarly, small rotary selectors are not coded to differentiate pumps and values. Also, spring return controls are not identified in contrast with fixed-position controls. Consequently, the original control coding scheme should be elaborated to make further distinctions between controls. Table 3-1 includes an enhancement column which indicates supplementary color and labeling cues to further differentiate controls.

2. Guard Rail - A guard rail to the edge of the apron section of primary consoles should be added to minimize opportunities for accidentally disturbing control settings for controls near the edge of the apron.

3. Guard Critical Controls - Review the importance of individual controls on a panel-by-panel basis and add protective covers over controls that warrant special protection. Where added protective features would unduly slow down operator response, critical controls should be highlighted by means of red demarcation lines, oversized white-on-red labels, and a red pushbutton collar or control knob (see Figure 3-1).

Table 3-1

CONTROL CODING

Control Type	Present Coding of System Components	Enhancement
Pistol Grip	o Pumps o Fans o Circuit Breakers o Seal-in Valves	o Add white 1/2 inch tape band to pump controls as follows:  yellow band
Star Shape Knob	o Electronic Voltage Regulator o Selector Switch for ammeters and volt-meters. o DEH Pumps o RX Inboard Injection Valves (Both Seal-in and throttle	o Replace star knob with yellow banded pistol grip for DEH Pumps o Use oval, fluted knob for RX Inboard Injection Throttle valve o Use pistol grip for Seal-in-Inboard Injection Valve
Oval Fluted Knob	o Throttle Valves	
Metal Gold Key-Lock pistol grip	o RX Mode Switch o SLC pumps & Sys C/S o REC/SW System Crosstie o 345 KV Circuit Breaker Close Permissive	o Place yellow tape band across shank of pistol grip for pump control
Round Pushbuttons	o Annunciator Controls o Logic trips and resets o Test Circuits	

Table 3-1 (CONT'D)

CONTROL CODING

Control Type	Present Coding of System Components	Enhancement
Square Pushbuttons	o DEH Controls o SRM/IRM Controls and Control Rod Select Matrix	o If square pushbuttons and square indicator lights are both used and can be confused, code pushbuttons as follows: 
Keylock Switches	o Seal-in 2 position switches for valves o 3 position for containment spray control o DEH overspeed trip test o Scram bypasses	o Provide a locked cabinet for storing keys when not in use.
Small Rotary Selector switches 2 or 3 positions	o Small pumps o Valves - seal-in and spring return o Selector switches o Relief Values o Isolation Logic Resets o Annunciator Panel Bypasses	o Provide white collar for pumps c Add MOM (momentary) label notation for spring-return controls
Large Rotary Selector Switches	o Drawer Function o Tip Indexes/APRM, LPRM's o IRM Ranges o Main Turbine Supervirosy Panel o Process Controllers	

Table 3-1 (CONT'D)

CONTROL CODING

Control Type	Present Coding of System Components	Enhancement
Toggle Switches	o Power on/Off o Turbine Supervisory Panel-vibrations o Dahl Controllers for RX feedwater pumps o RPIS	
Oval Knobs	o Electrical Lockout Devices: - RFPs - Main Generator - 345 KV - 4160 V	

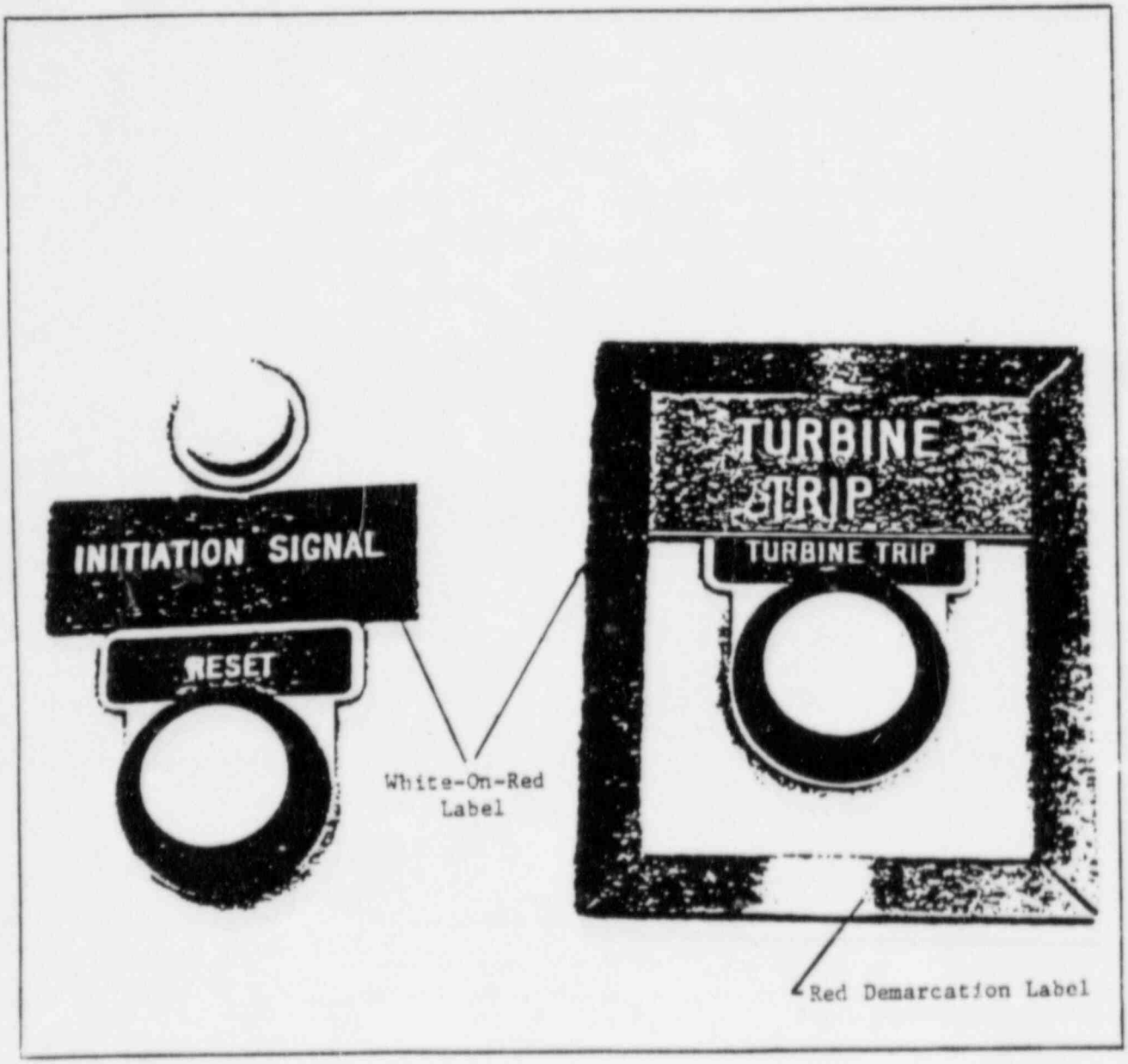


FIGURE 3-1. HIGHLIGHTING OF CRITICAL CONTROLS USING RED DEMARCATION BOARDER, WHITE-ON-RED LABEL, AND A RED COLOR ON THE PUSHBUTTON.

3.4 REFERENCES

1. NUREG-0700, Guidelines For Control Room Design Reviews, Nuclear Regulatory Commission, August 1981.

2. EPRI NP-309, Human Factors Review of Power Plant Control Rooms, March 1977.

3. EPRI NP-3659, Human Factors Guide For Nuclear Power plant Control Room Development, August 1984.

4. VISUAL DISPLAYS

4.1 GENERAL OBJECTIVE

Displays should be selected, located, and formatted to permit error-free interpretation to the required level of accuracy and within the operator response time limits imposed by the system.

4.2 VISUAL DISPLAY DESIGN PRINCIPLES

1. Usability of Quantitative Display Values - Scale units should be consistent with the degree of precision needed by the operator. Scale range should span the expected range of operational parameters. Displays should indicate values in a form immediately usable by the operator without requiring time-consuming or error-inducing conversions.

2. Unnecessary Information - Unnecessary information should be avoided since it serves as visual clutter that may be distracting.

3. Readability - Scale characters should be of a size and style to promote readability from the operator's viewing position. Character height should be a minimum of 0.004 x viewing distance and preferably 0.006 x viewing distance. Good contrast between numerals, markings, pointer and background should be provided (preferably black and white). Scale characters and spacing should observe the dimensions for characters presented in Section 6.

4. Scale Markings - Scale markings for meters and chart recorders should normally contain major, minor, and intermediate graduations of the dimensions shown in Figure 4-1; adjusted based on viewing distance as shown in Figure 4-2. No more than nine graduations should separate scale numerals. Major and minor graduations should be used if there are up to four graduations between numerals. If there are five or more graduations, then major, intermediate and minor graduations should be used.

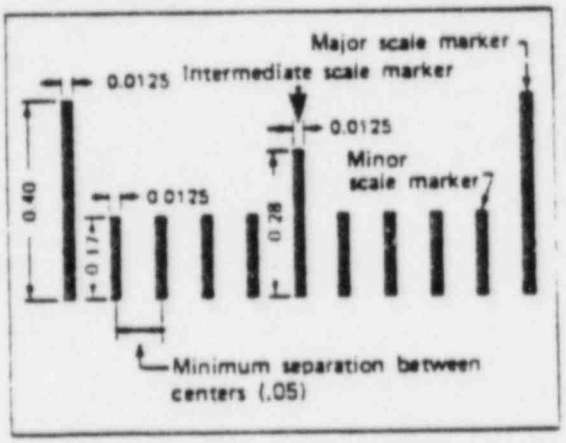


FIGURE 4-1. MAJOR, INTERMEDIATE, AND MINOR GRADUATION DIMENSIONS AND SPACING FOR A THREE FOOT VIEWING DISTANCE.

VIEWING DISTANCE (feet)	GRADUATION HEIGHT (inches)		
	MAJOR	INTERMEDIATE	MINOR
1½ or less	0.22	0.16	0.09
3 or less	0.40	0.28	0.17
6 or less	0.78	0.56	0.34
12 or less	1.57	1.12	0.65
20 or less	2.63	1.87	1.13

FIGURE 4-2. SCALE MARKING DIMENSIONS FOR VARIOUS VIEWING DISTANCES

5. Scale Progression - Scale numeral values should be in units of 1, 2, 5, or mutiples of 10 for large numerical values. Where small numerical values are needed, use of a division factor of 10 should be considered to eliminate decimal values. Where small numerical values are needed, it is acceptable to use decimal values, e.g., .1, .2, .3... or .02, .04, .06,... However, for very small values where more than one zero is required after the decimal point, a scale multiplier should be provided on the scale, e.g., 1/1000. Avoid progressions such as 3,6,9,12 etc or 6,12,18,24, etc. Logarithmic and multiscale displays should be avoided when possible.

6. Scale Compatibility - When two or more displays of the same parameter are to be read comparatively by the operator, the scales should be identical.

7. Scale Directionality - Scale progressions on circular meters should be oriented so that a clockwise movement of the pointer produces an increase in values. For linear scales, an upward pointer movement (vertical scales) or a rightward movement (horizontal scales) should produce an increase in values (Refer to Figure 4-3).

8. Pointer - Scale Relationship - The pointer tip should extend to within about 1/16 inch of the smallest graduation marks on the scale and preferably should avoid overlapping numerals. The pointer should be mounted in a plane that is flush with or close to that of the scale so as to avoid or minimize parallax reading errors.

9. Scale Banding - Meter and recorder scales should be color banded to provide the operator an indication of normal, marginal and out-of-tolerance conditions.

10. Indicator Light Availability - Indicator reliability should be insured by means of dual lamp or dual filament bulbs, or lamp test features. The intensity of the lamps should be such that actuated and deactuated states can be easily differentiated under prevailing lighting conditions. The illuminated indicator should be at least 10% greater in light intensity than its background.

11. Positive Indications - The absence of a light (negative indications) should not be intended to convey important information to operators. Positive indications of system status should be provided.

12. Servicing Displays - Displays should be designed for ease of servicing:

    - o Replacement of lamps without the necessity of special tools
    - o Correct and easy replacement of chart recorder paper
    - o Ease of inking chart recorders
    - o Ready availability of expendibles used for servicing displays

13. Display Units - Scale units should be provided on meters and chart recorder scales. These units should match those called out in procedures.

14. Indication of Display Failure - When a meter or chart recorder fails, the inoperative status of the device should be apparent to the operator, e.g., off-scale pointer position rather than failure in a normal reading scale zone.

4.3 ENHANCEMENT STANDARDS AND IMPLEMENTATION GUIDELINES

Based on task analysis methodology the informational needs of operators should initially be determined. The required scale range, required accuracy of reading, and available operator response time will serve as the basis for enhancing the existing display system. These analyses should also define normal and abnormal scale range zones for specific parameters that are displayed. With this foundation, the following enhancements should be instituted:

1. Replace Inadequate Meter Scales - New meter scales should be procured in cases where the following deficiencies are noted:

- o Improper scale range
- o Improper design of major, intermediate, and minor graduation markings
- o Improperly sized numerals and markings for actual operator reading distances
- o Improper scale progressions
- o Incompatible scales for meters that should be read comparatively
- o Scales that require conversions, i.e, do not permit direct readings, e.g., percentage scales often fall in this category.
- o Scales with improper directionality, e.g., increase in value from top-to-bottom
- o Scales where there is inadequate contrast between scale markings and background.

Replacement scales should be patterned on the design principles provided in Section 4.2 above. Figure 4-3 provides examples of well designed meter scales that should serve as models for enhancement purposes.

2. Review Operator Mods To Scales - Some scales have been modified by operators or technicians. These mods should be reviewed for conformance with the design principles provided in Section 4.2. Where deviations from human engineering design principles exist, these scales should be replaced.

3. Color Banding - Scales for meters and chart recorders (where appropriate) should be color banded with a green band to indicate the normal operating zone. The coding material should be of a light green transparent material affixed directly to the scale or a painted green band adjacent to the scale range, depending on the existing meter or recorder design. Flanking this green band, red arrows should be placed to indicate "entry to emergency" conditions. Figure 4-4 illustrates the convention to be followed.

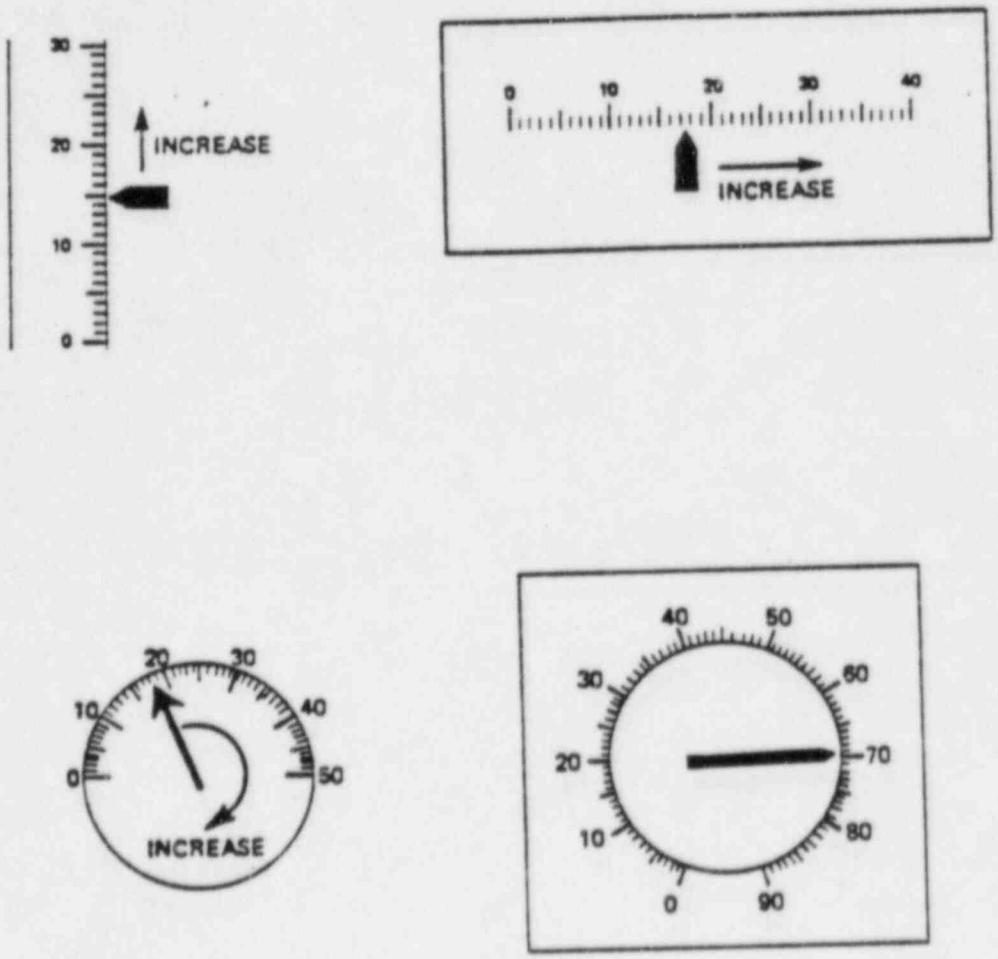


FIGURE 4-3. RECOMMENDED SCALE CHARACTERISTICS

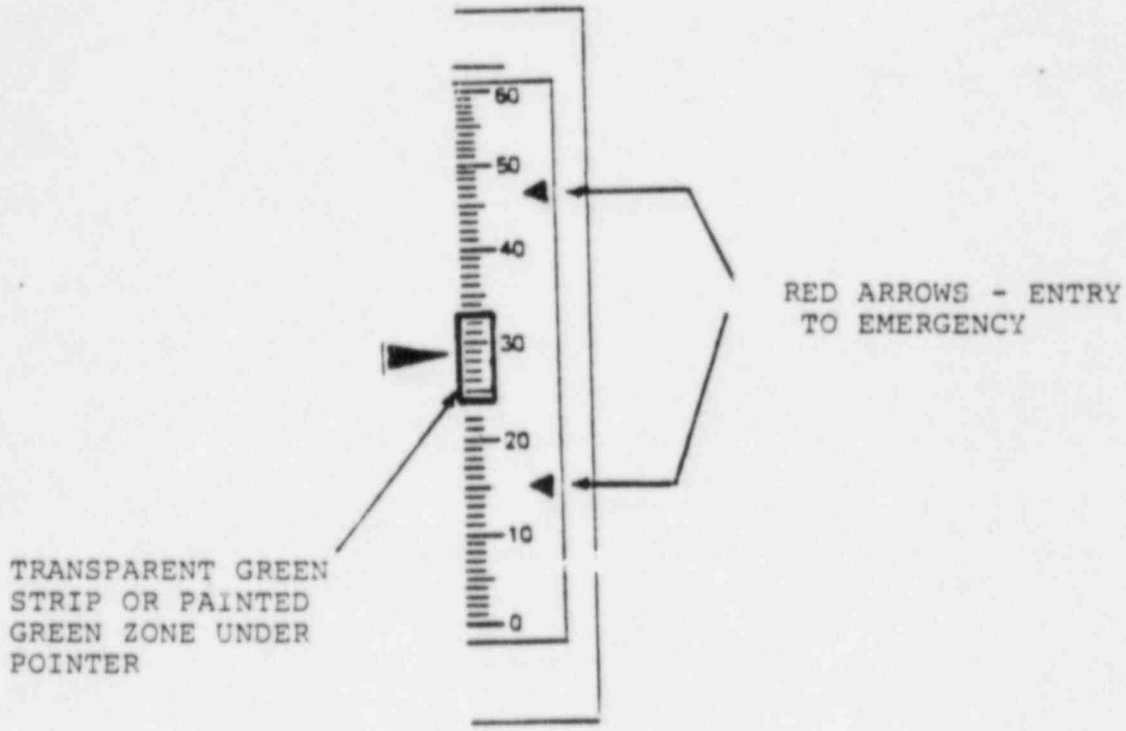


FIGURE 4-4. COLOR BANDING CONVENTION FOR METER AND CHART RECORDER SCALES

4. Indicator Light Availability - Addition of dual lamp redundancy or lamp test features on a retrofit basis is not practical considering the potential impact on circuitry reliability. Dual filament lamps, if available and compatible with existing indicator devices, should be employed. If this is not possible, a rigorous (once per shift) surveillance of all displays should be conducted to detect expended lamps. These lamps should be replaced with aged lamps, to eliminate "infant mortality" problems.

5. Negative Indications - Where the absence of an indication is used to convey important information, positive indications should be added to the panels. For example, if VALVE OPEN/CLOSED status is to be displayed, a positive indication for both the OPEN and CLOSED status is needed. It is not sufficient to merely display the OPEN condition based on the assumption that if the OPEN light is off then the valve must be closed.

6. Display Units - Where lacking, display units should be noted on scales. These units should be identical to those referred to in procedures. Where scale space is limited, special unit labels should be added to the face of meter or recorder, or units should be incorporated in the identifying labels.

4.4 REFERENCES

1) NUREC-0700, Guidelines For Control Room Design Reviews, Nuclear Regulatory Commission, August 1981.

2) EPRI NP-2411, Human Engineering Guide For Enhancing Nuclear Control Rooms, May 1982.

3) EPRI NP -3659, Human Factors Guide For Nuclear Power Plant Control Room Development, August 1984.

4) McCormick, E.J., Human Factors Engineering, McGraw-Hill, 1980.

5) Human Engineering Guide to Equipment Development, U.S. Government Printing Office, 1972.

5. CONTROL - DISPLAY INTEGRATION

5.1 GENERAL OBJECTIVES

Controls and their associated displays should be so arranged that operators can readily and accurately perceive relationships between control actions and display feedback of system response.

5.2 CONTROL-DISPLAY INTEGRATION PRINCIPLES

The following guidelines permit operators to manipulate controls in a manner that does not compromise the readout of associated displays:

1. A visual display that will be monitored for feedback during its associated control manipulation should be located sufficiently close to the control so that the operator can read it clearly and without parallax from the required control operation position. Displays associated with controls should not be separated to the extent that reading accuracy is compromised or to require two operators; one for control manipulation and the other for display reading.

2. Controls and their associated displays should be organized so that the operator's hand does not overlap and obscure the display during control manipulation.

3. Associations between related controls and displays should be made manifest to operators by means of such techniques as: panel location, panel arrangement (functional demarcation or mimics), labeling and coding.

4. Controls should generally be centered below their associated displays. Where this is not possible, controls should be mounted to the right of associated displays.

5. Where there is a normal order of sequential control actuations, the controls should be arranged for use in a left-to-right or top-to-bottom sequence.

6. Where multiple displays are affected by a single control, the control should be centered below the display grouping and the control options should be organized to match the sequence of displays. Control position labels should match display labels.

7. Related displays should be organized in the normal or prescribed viewing sequence, where a fixed or preferred sequence exists. Displays should be arranged in a left-to-right order or top-to-bottom to match the arrangement of related controls.

8. Arrangements of functionally similar controls and displays that are repeated from one panel to another should be consistent.

9. Display responses to control movements should be consistent, predictable, and compatible with the operator's expectations. For example, rotary controls should turn clockwise to cause an increase in parameter value. If the corresponding display is a circular meter, the pointer should move clockwise to correspond to the increase in parameter value. If the corresponding display is a linear, vertical meter, the pointer should move from bottom-to-top to indicate an increase in value.

5.3 ENHANCEMENT STANDARDS AND IMPLEMENTATION GUIDELINES

The control-display integration principles described above should be applied in the design of new panels or consoles added to the control room. For panel enhancement purposes, application of these principles on a retrofit basis may involve unacceptable rearrangements of control panel elements and associated circuitry modifications. For example, it

may not be practical to reposition controls on the apron section of a console so that they are always directly below their associated indicators due to the lack of available spare panel space or because the existing functional logic of the present arrangement might be compromised.

Given these limitations to a complete reworking of existing panels, there are measures that can readily be implemented to enhance control-display integration aspects of existing panels. The following options are available:

1. Association Lines - Where the relationship between a control and its associated feedback displays is not clear from positional relationships, as shown in Figure 5-1, then appropriate association lines should be provided using 1/8th inch blue automotive pinstriping as illustrated in Figure 5-2. This approach applies when controls and related displays are in the same area.

2. Functional Demarcation and Hierarchical Labeling - Where controls are generally located on the apron section of the console and associated displays are segregated on the vertical section of the console, functional demarcation coupled with hierarchical labeling may best allow the operator to make timely and correct associations between related, disassociated panel elements. Figure 5-3 provides a line drawing of a panel where controls are not organized directly below their respective displays. Figures 5-4 and 5-5 provide two alternate means for heightening the correct association of controls and displays without moving panel elements. Since the "A" control elements are not below the "A" indicators it is possible to misassociate controls and displays in the original undemarcated configuration (Figure 5-3). While the enhancements offered as Figures 5-4 and 5-5 may appear somewhat ungainly, a total redesign of the panel, as illustrated in Figure 5-6, would be required to provide an optimal solution.

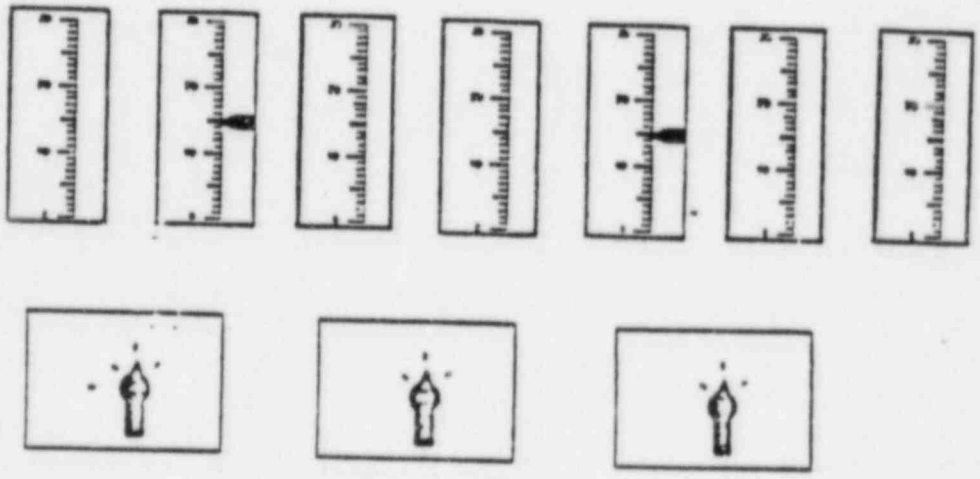


FIGURE 5-1. THE RELATIONSHIP BETWEEN CONTROLS AND ASSOCIATED DISPLAYS IS NOT CLEAR FROM POSITIONAL RELATIONSHIPS.

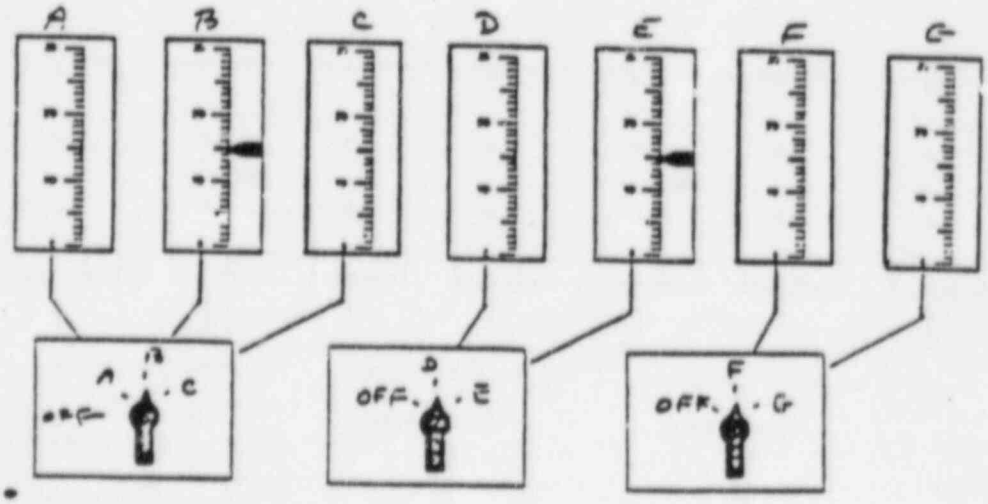


FIGURE 5-2. LINES OF ASSOCIATION TIE CONTROLS TO THEIR RESPECTIVE DISPLAYS

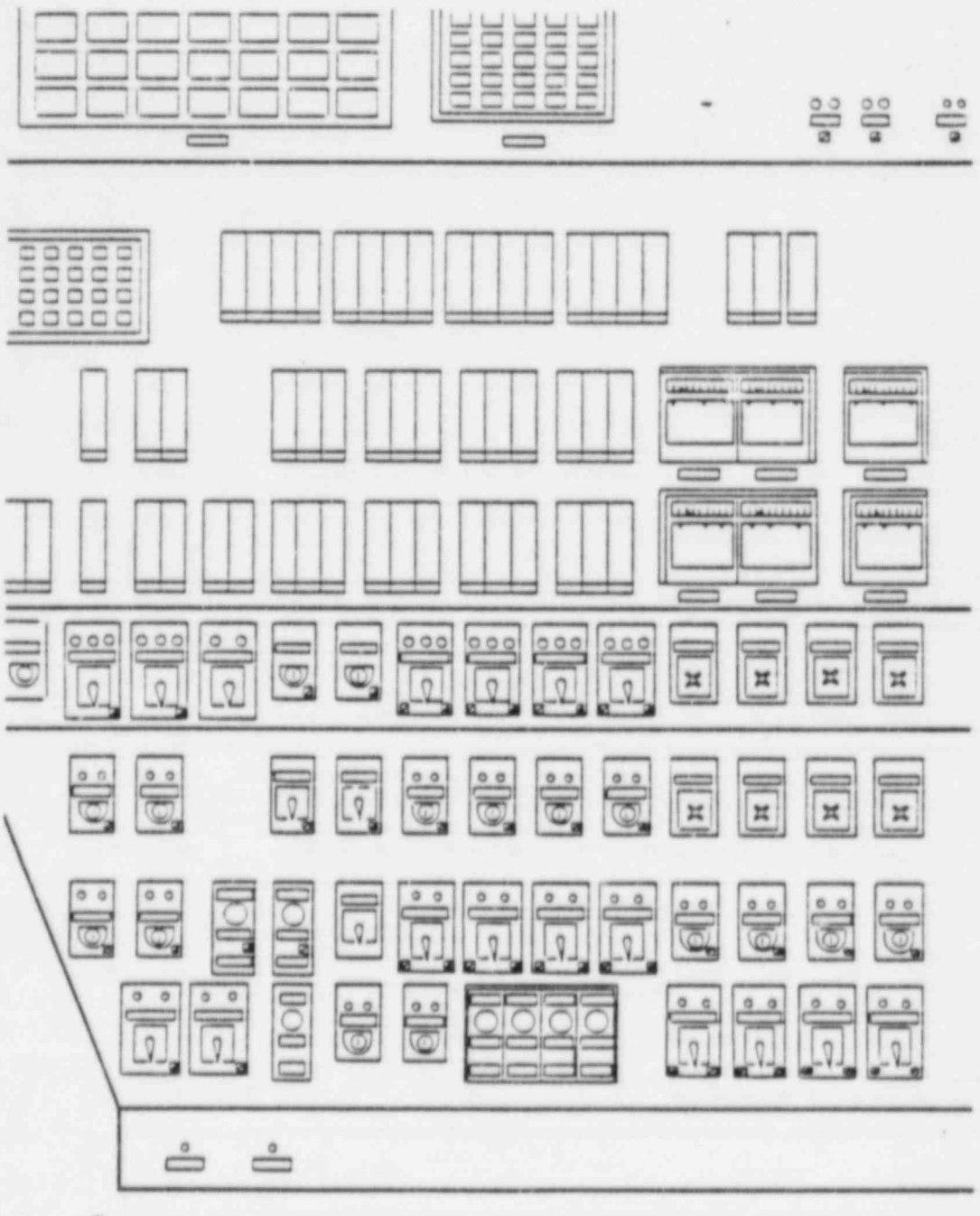


FIGURE 5-3. LINE DRAWING OF A PANEL WHERE CONTROLS ON THE APRON SECTION ARE NOT LINED UP WITH ASSOCIATED DISPLAYS ABOVE ON THE VERTICAL BOARD SECTION.

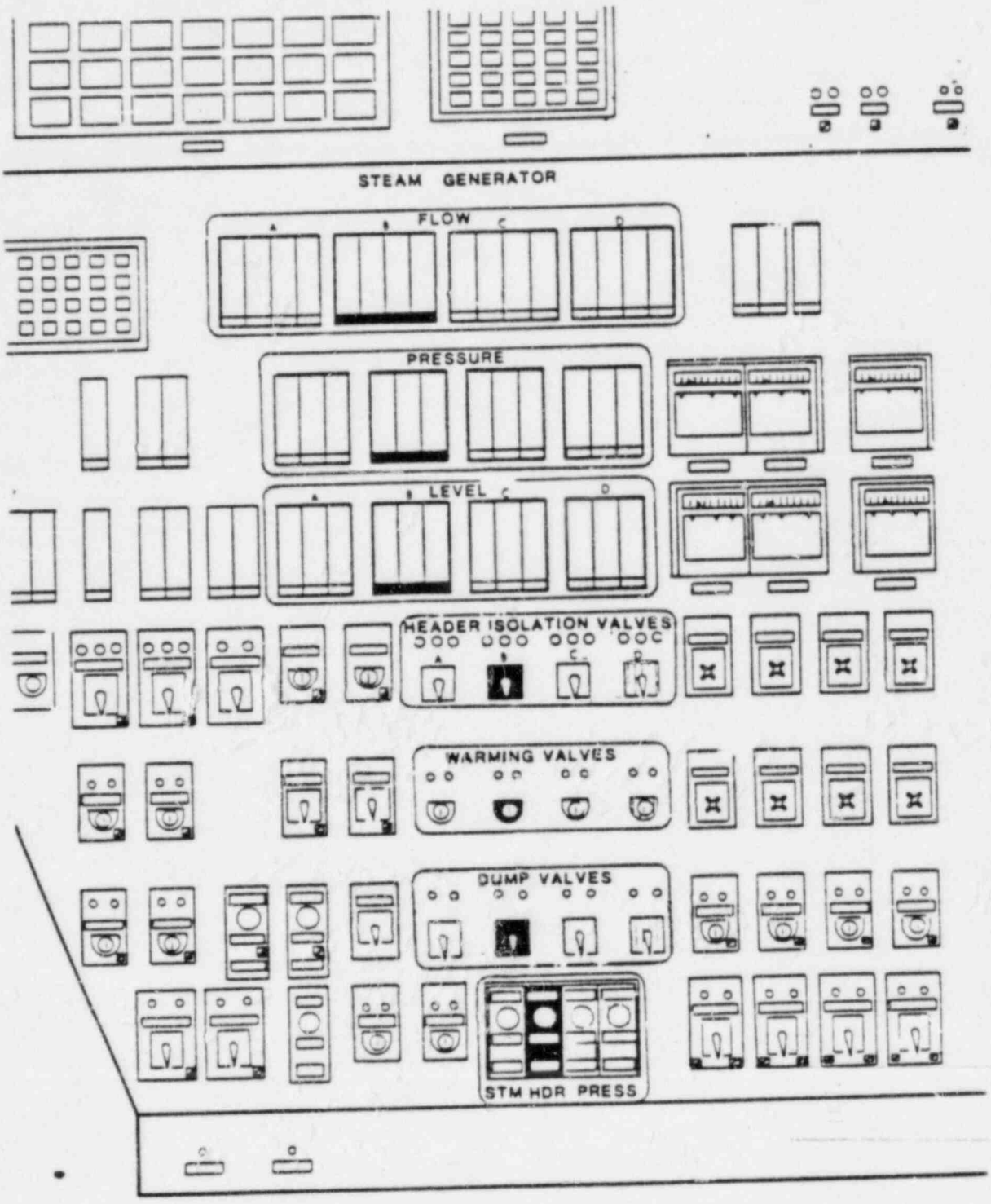


FIGURE 5-4. FUNCTIONAL GROUPING OF DISPLAYS AND CONTROLS SO THAT A,B,C,D. ELEMENTS CAN BE MORE READILY BE IDENTIFIED THROUGH POSITION CUES THAT SUPPLEMENT LABELING.

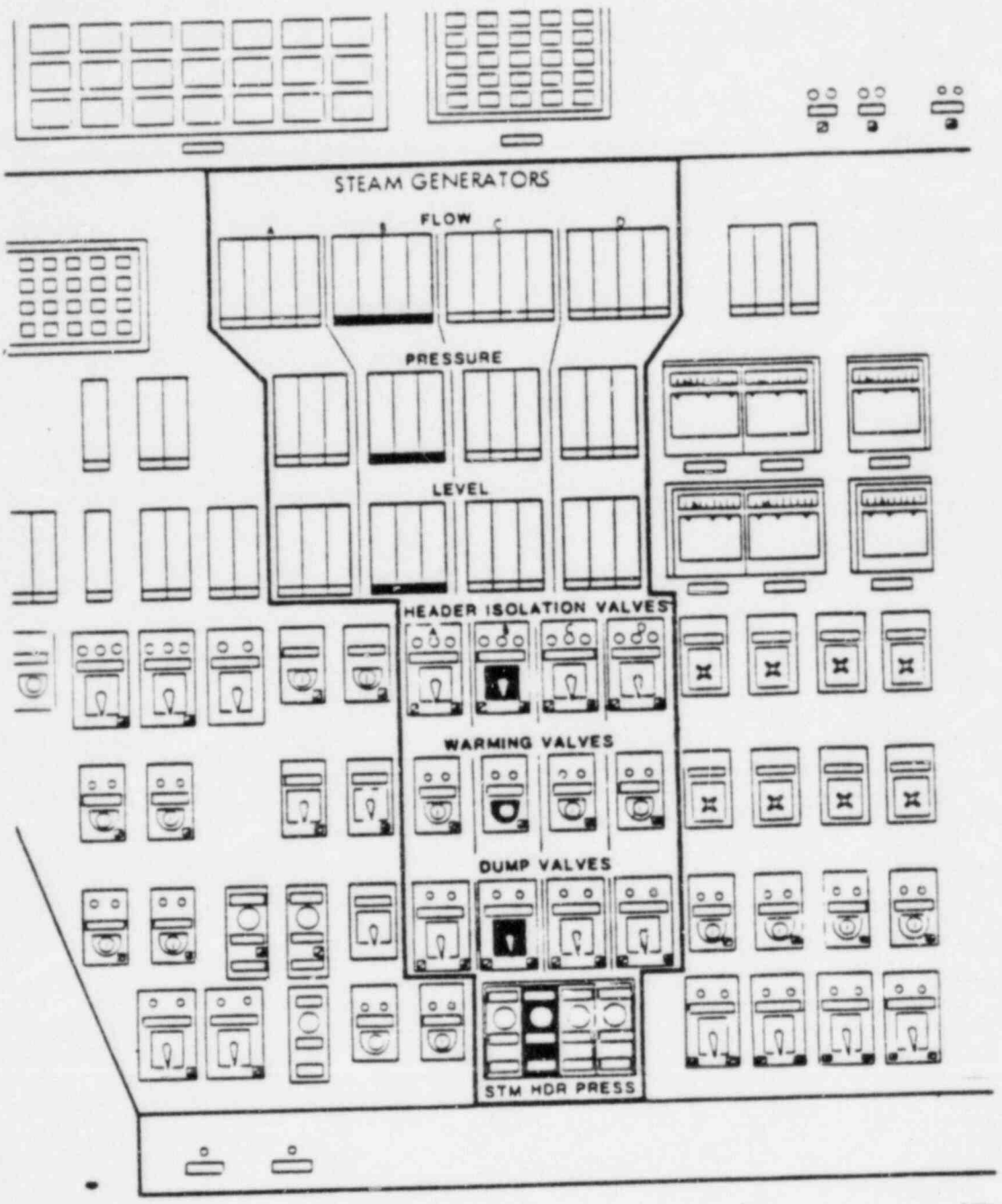


FIGURE 5-5. AN ALTERNATE METHOD FOR USE OF DEMARCATION LINES TO REVEAL THE ALIGNMENT OF A,B,C,D CONTROL AND ASSOCIATED DISPLAY ELEMENTS

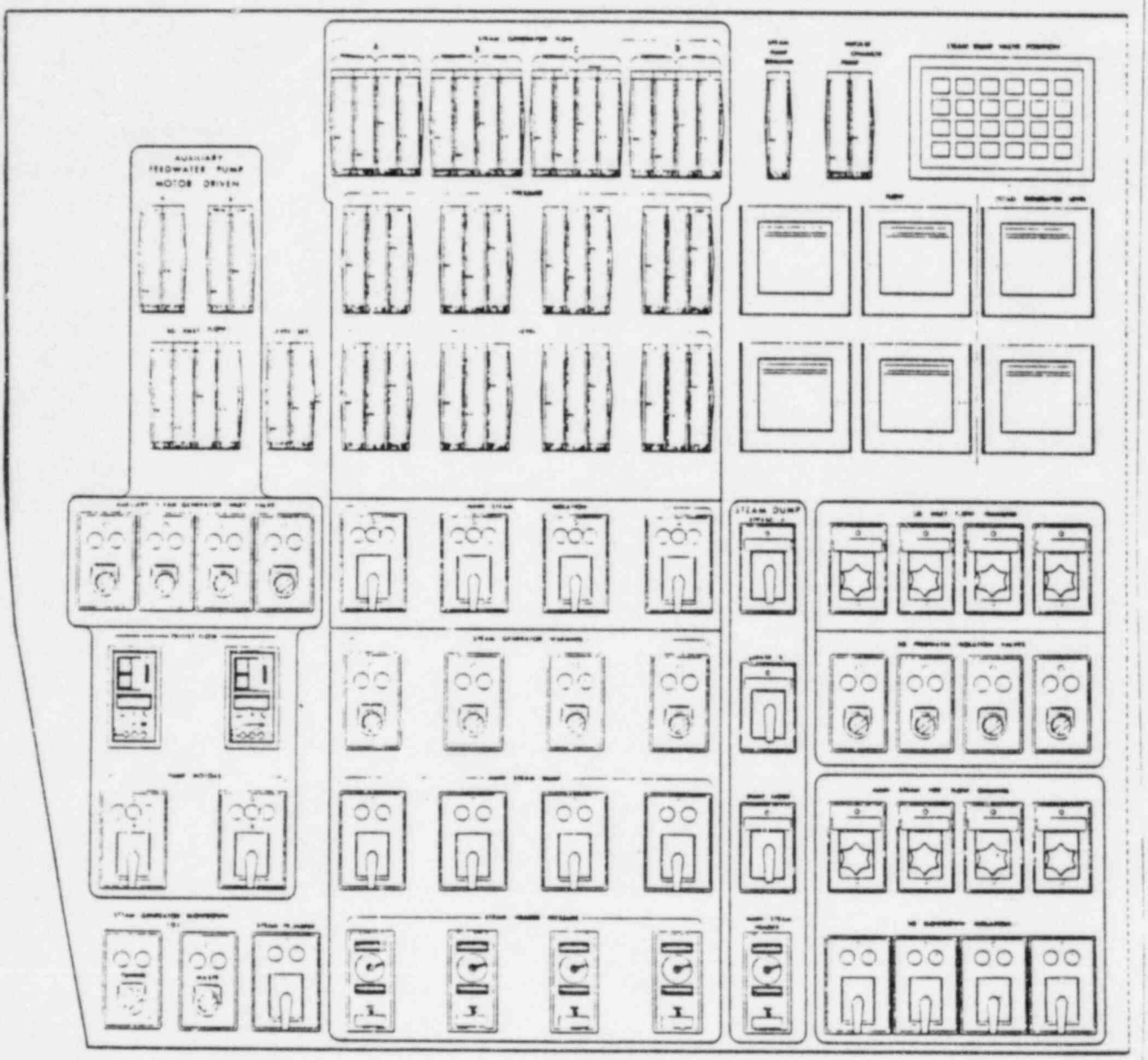


FIGURE 5-6. REDESIGN OF THE PANEL SHOWN AS FIGURE 5-3 TO OPTIMIZE THE PANEL ARRANGEMENT.

3. Color Coding - Color can be used to convey the association between related groupings of controls and corresponding displays. Several color coding approaches are possible. The borders used for functional demarcation purposes can be color coded to promote the correct associations. Figure 5-7 shows the application of color coded functional demarcation lines for control and related display groupings.

   A variation of this technique is the so-called "paint patch" approach. This involves the use of painted sections of the background panel surface to designate groups of controls and displays. Matching paint patches identify the appropriate associations as illustrated in Figure 5-8.

   A third color coding approach involves matching colors for display bezels and control escutcheons or knobs. This approach is illustrated in Figure 5-9.

   Color coding for the purposes outlined above should be used sparingly and judiciously. Such coding must also be compatible with other color coding practices described in Section 7. Where color coding is overused, it is easy to introduce excessive visual clutter.

4. Miscellaneous Cues - Alphanumeric codes have been developed and applied to promote control-display associations where there is no geographical correspondence between the location of controls and associated displays. Such areas can be integrated into panel element labels. For example, controls designated A,B,C would have corresponding indicators labeled A,B,C as illustrated in Figure 5-10. Such cues are relatively simple to employ but are less preferable than the other approaches outlined above since they do not enhance operator response time. In addition to showing

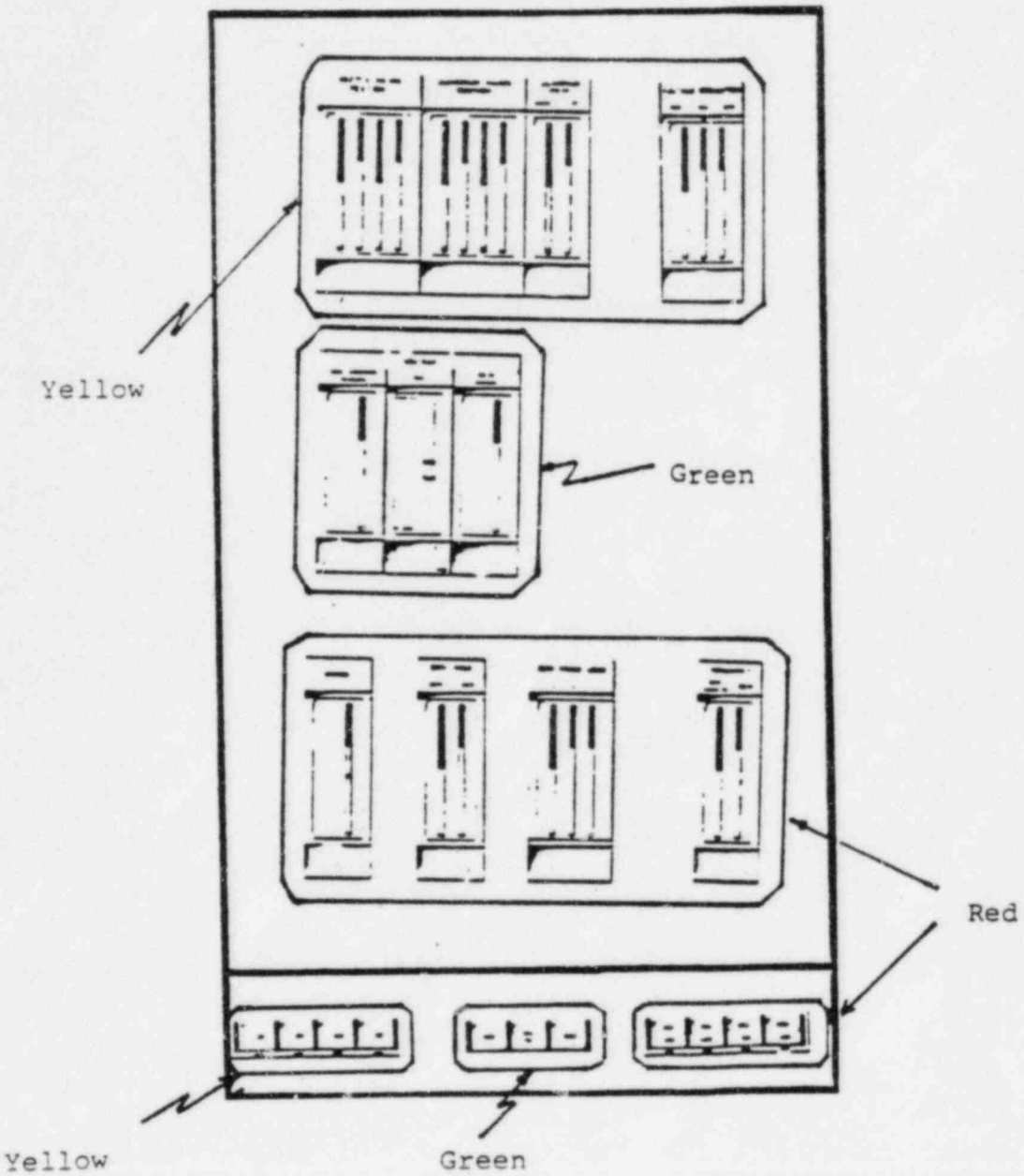


FIGURE 5-7. COLOR CODED FUNCTIONAL DEMARCATION LINES CAN BE USED TO ASSOCIATE RELATED GROUPINGS OF CONTROLS AND DISPLAYS.

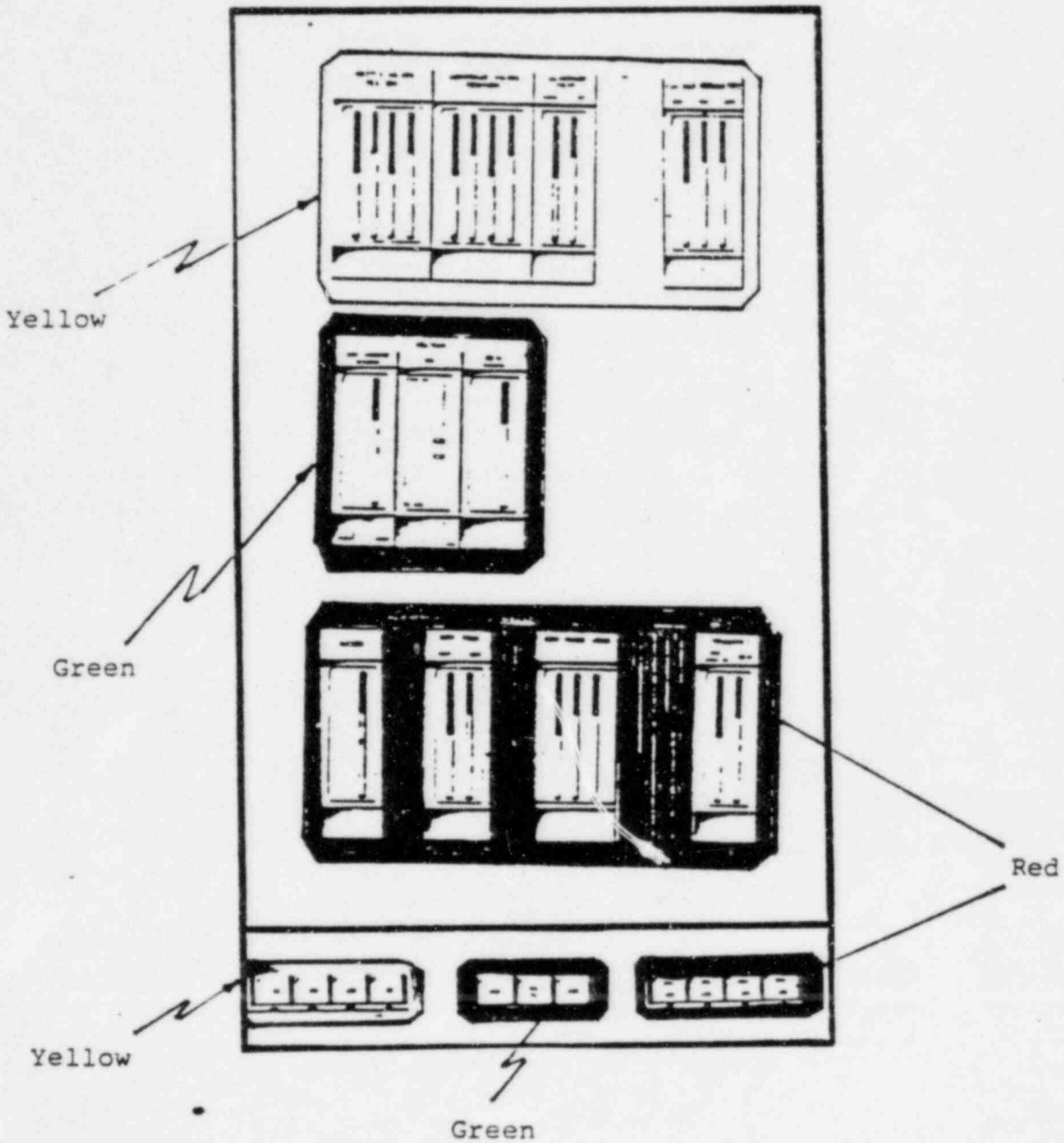


FIGURE 5-8. THE PAINT PATCH APPROACH FOR SHOWING THE RELATIONSHIP BETWEEN CONTROLS AND DISPLAYS

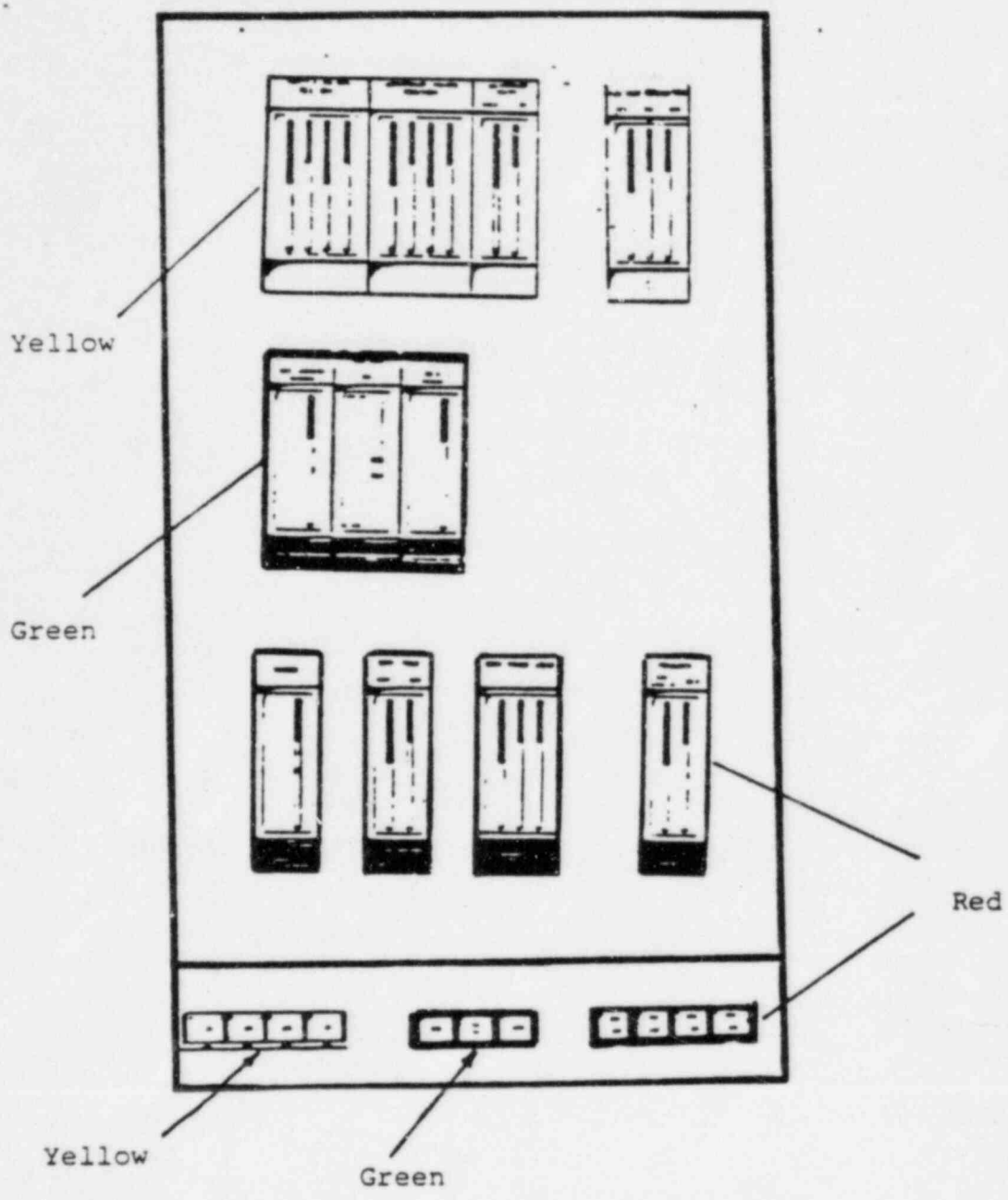


FIGURE 5-9. THE BEZELS OF INSTRUMENTS AND CONTROLS CAN BE PAINTED MATCHING COLORS TO REVEAL ASSOCIATIONS.

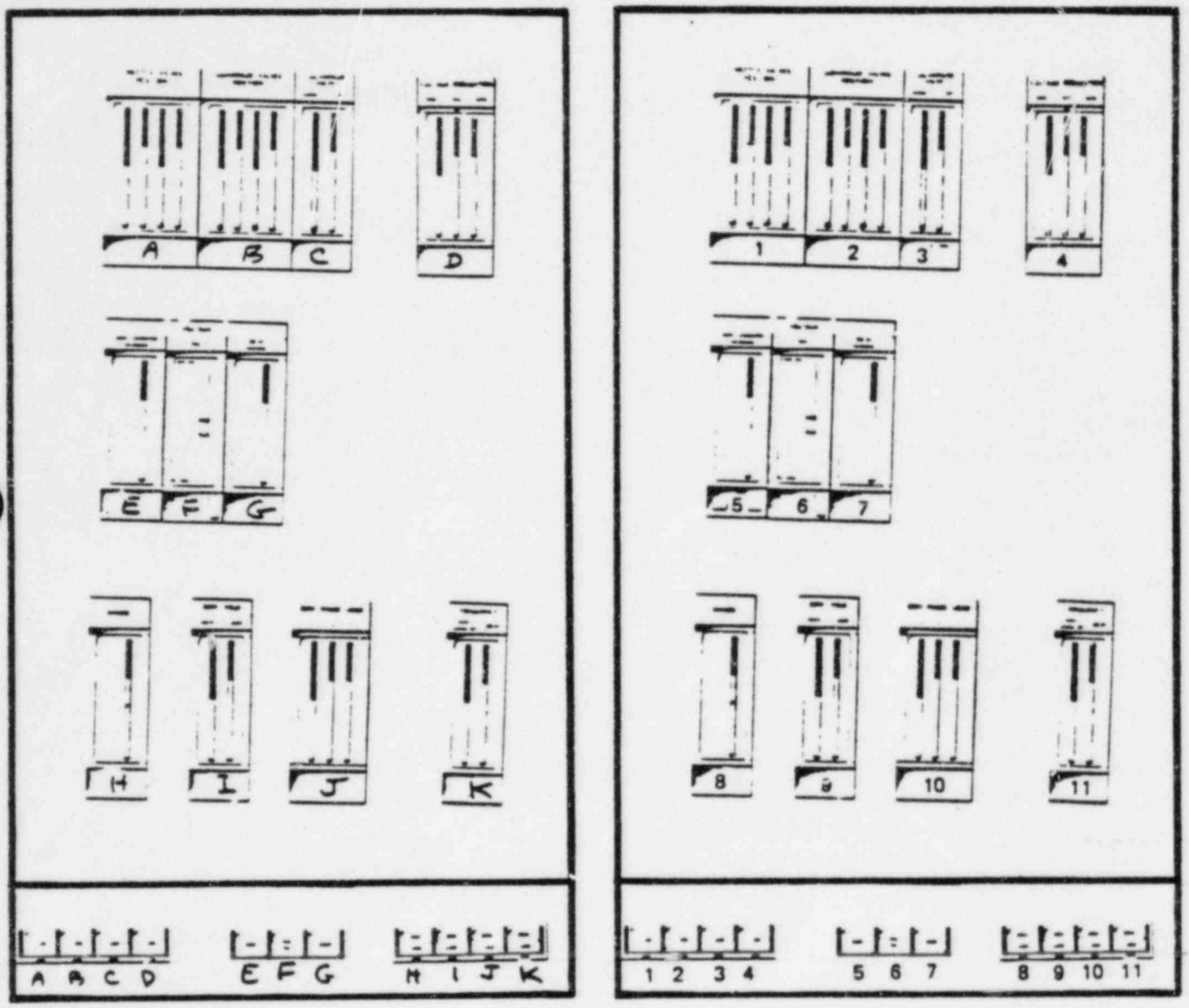


FIGURE 5-10. LETTER OR NUMBER CODES CAN BE USED TO ASSOCIATED CONTROLS AND DISPLAYS.

correspondence between controls and displays, the A,B,C sequence should reflect the order of operation and viewing, where applicable.

5. Functionally Similar Control and Display Grouping Consistency - Where arrangements of functionally similar controls and displays are repeated from one panel to another, the arrangement should be consistent. For example, annunciator controls are repeated along the control boards. The arrangement of SILENCE, ACKNOWLEDGE and TEST pushbuttons should be consistent from location to location. Where this is not the case, control shape coding may be employed if rearrangement of discrepant arrangements is not possible.

6. Display Responses to Control Movements - The response of a display to control movements should be consistent, predictable and compatible with the operator's expectations. The following control-display relationships should be observed:

Control Movement	Associated Display Response
CLOCKWISE ROTATION OF ROTARY CONTROL	o Vertical linear scales: Pointer moves up. o Horizontal lines scales: Pointer moves to right.
or	o Circular scales: pointer moves clockwise o Digital displays: Values increase
FORWARD OR RIGHT MOVEMENT OF LINEAR CONTROLS	o Vertical string of indicator lights: Bottom-to-top actuation o Horizontal string of indicator lights: Left-to-right actuation

5.5 REFERENCES

1. NUREG-0700, Guidelines for Control Room Design Reviews, USNRC, Aug. 1981.

2. EPRI NP0-1118, Human Factors Methods for Nuclear Control Room Design, Vol.1: Human Factors Enhancement of Existing Nuclear Control Rooms, Nov 1979; Vol III: Human Factors Methods for Conventional Control Board Design, Feb. 1980.

3. EPRI NP-2411, Human Engineering Guide for Enhancing Nuclear Control Rooms, May 1982.

4. EPRI NP-3659, Human Factors Guide for Nuclear Power Plant Control Room Development, August 1984.

6. LABELING

6.1 GENERAL OBJECTIVE

Labeling provides the information that allows for operator discrimination of required controls or displays, and the assurance that the correct action or display reading is being made. Controls, displays, and any other items of equipment which must be located, identified, read or manipulated shall be appropriately and clearly labeled to permit rapid and accurate human performance. Labels are generally used to:

1. Identify a specific control or display

2. Describe the function of a control or display

3. Describe the operation of a control

4. Describe relationships among controls and displays

5. Provide information on hazards or special conditions

6.2 LABEL ENHANCEMENT PRINCIPLES

A well designed labeling system should observe the following principles:

1. Hierarchical Scheme - Should be used to reduce confusion, operator search time, and redundancy. Labels should be differentiated as follows: Major labels used to identify major systems, Subordinate labels used to identify subsystems or functional groups and Component labels used to identify each discrete panel or console element.

2. Label Placement - Labels should be normally placed consistently above the panel element(s) they describe. Labels should be placed near the items they identify, and should not appear on the control

itself when an adjustment or manipulation is required that causes the operator's hand to obscure the label for an extended time period. Adjacent component labels shall be separated by sufficient space so as not to be read as one continuous label. Labels should be durable and securely mounted to panels.

3. Label Orientation - Labels should normally be oriented horizontally so that labels may be read quickly and easily from left-to-right. Vertical orientation shall be used only when space is limited. Curved patterns of labeling should be avoided.

4. Label Visibility - Labels should not obscure any other information source, and should not be covered or obscured by other components in the equipment assembly, e.g., tags.

   Labels should be clearly visible to the operator during control operation. Administrative procedures should be in place for the periodic cleaning of labels to ensure proper contrast between label characters and their background.

5. Label Content - Labels should describe the primary function of the equipment item. If needed for clarity or to facilitate operations, secondary information should also be described, e.g., equipment component number-letter designation, power source, etc.

   Words employed in the label should express what action is intended. Instructions shall be clear and direct. Unusual technical terms should be avoided, and words should be spelled correctly. Brevity should not be used if the results are unfamiliar to the operators. Words on labels should be concise and still convey the intended meaning.

   Labels should be consistent across pieces of equipment in their words, acronyms, abbreviations, and part/system numbers.

Functionally grouped controls and displays should be identified through summary labeling located above the cluster of related panel components.

Control positions should be labeled at all discrete functional positions, and direction of motion (increase or decrease) should be identified for continuous motion rotary controls. Each control position should be visible to the operator during operation of the control.

Access openings used by the operators should be labeled to identify the function of items accessible through it. All danger, warning, and safety instruction labels should be in accordance with appropriate safety standards.

Abstract symbols should be used only if they have a commonly accepted meaning for all intended users (e.g.,%). Roman numerals should be avoided.

6. Label Readability - The speed and accuracy of human performance in identifying control/displays is influenced by the style and size of characters used for label lettering. Labeling should conform to the following criteria:

   A. Character height should subtend a visual angle of 15 minutes as a minimum, or 0.004 X viewing distance. A visual angle of 20 minutes, or .006 viewing distance, is preferred.

   B. Letter height should be identical for all labels within the same hierarchical level, based on maximum viewing distance.

   C. To ensure adequate contrast and prevent loss of readability because of dirt, dark characters on a light background are preferred.

D. If colored print is used for coding purposes, it should conform to the established color scheme for the control room. Colors should be chosen for maximum contrast against the label background. Table 6-1 gives the legibility ratings for various combinations of letter and background colors.

E. Labels should be prepared in capital letters and the design of letters and numerals should be simple, without flourishes or serifs.

F. Character width-to-height ratio should be between 1:1 and 3:5. Numeral width-to-height ratio should be 3:5 except for the numeral "4", which should be one stroke width wider, and the numeral "1", which should be one stroke in width.

G. Stroke width-to-character height ratio should be between 1:6 and 1:8.

H. The minimum space between characters should be one stroke width.

I. The minimum space between words should be one character width.

J. The minimum space between lines should be one-half of the character height.

6.3 LABELING STANDARDS AND IMPLEMENTATION GUIDELINES

There are practical limits to the extent that the overall labeling scheme in the control room can be modified. Consequently, not all of the label design principles described above are generally applicable for enhancement purposes. They may, however, be applicable in procuring or developing new control room equipment. To remove all existing console labeling would cause considerable damage to the surface paint on the consoles. Repainting operational control boards is no easy task.

TABLE 6-1

RELATIVE LEGIBILITY FOR VARIOUS COMBINATIONS
OF LETTER AND BACKGROUND COLORS

Legibility Rating	Color Combination
Very good	Black letters on white background*
Good	Black on yellow
	Dark blue on white
	Grass green on white
Fair	Red on white
	Red on yellow
	White on black
Poor	Green on red
	Red on green
	Orange on black
	Orange on white

* NOTE: White letters on a black background also provide very good contrast if the white characters are kept free of dirt and dust.

Similarly, operators accustomed to present label locations (below displays and above controls) would have a difficult adjustment to make if labels were repositioned for consistent placement above both controls and displays. Finally, a "pure" size-graduated, hierarchical labeling scheme as shown in Figure 6-1 cannot be effected without a complete redesign of the present labeling scheme. Given these limitations, the following enhancement practices should be implemented:

1. Label Meaning - Review labeling on a panel-by-panel basis with operators to ensure that a common understanding exists with regard to label meaning. Where ambiguities exist, replace confusing labels with clearly understood labels.

2. Abbreviations - Review label abbreviations to ensure consistency and clarity of meaning. Attachment 1 provides a list of standard abbreviations. Replace labels with discrepant or confusing abbreviations.

3. Label Contrast - Institute periodic reviews of label contrast since existing white-on-black labels have a tendency to accumulate dirt and grime if good house-keeping practices are not observed. Labels that were not properly engraved to reveal sharp, white characters should be replaced. Also investigate the option of white filler for engraved labels that lack sufficient contrast.

4. Summary Labeling - While it may not be practical to institute a fully hierarchical labeling scheme, as shown in Figure 6-1, at a minimum summary labels can be provided to identify major console or panel segment and subpanel groupings of functionally related panel components. Observe the recommended character dimensions shown in Figure 6-2. The labeling enhancement approach for backpanel VBD-S, shown as Figure 6-2, illustrates the preservation of existing labeling coupled with the addition of summary console and subpanel labeling.

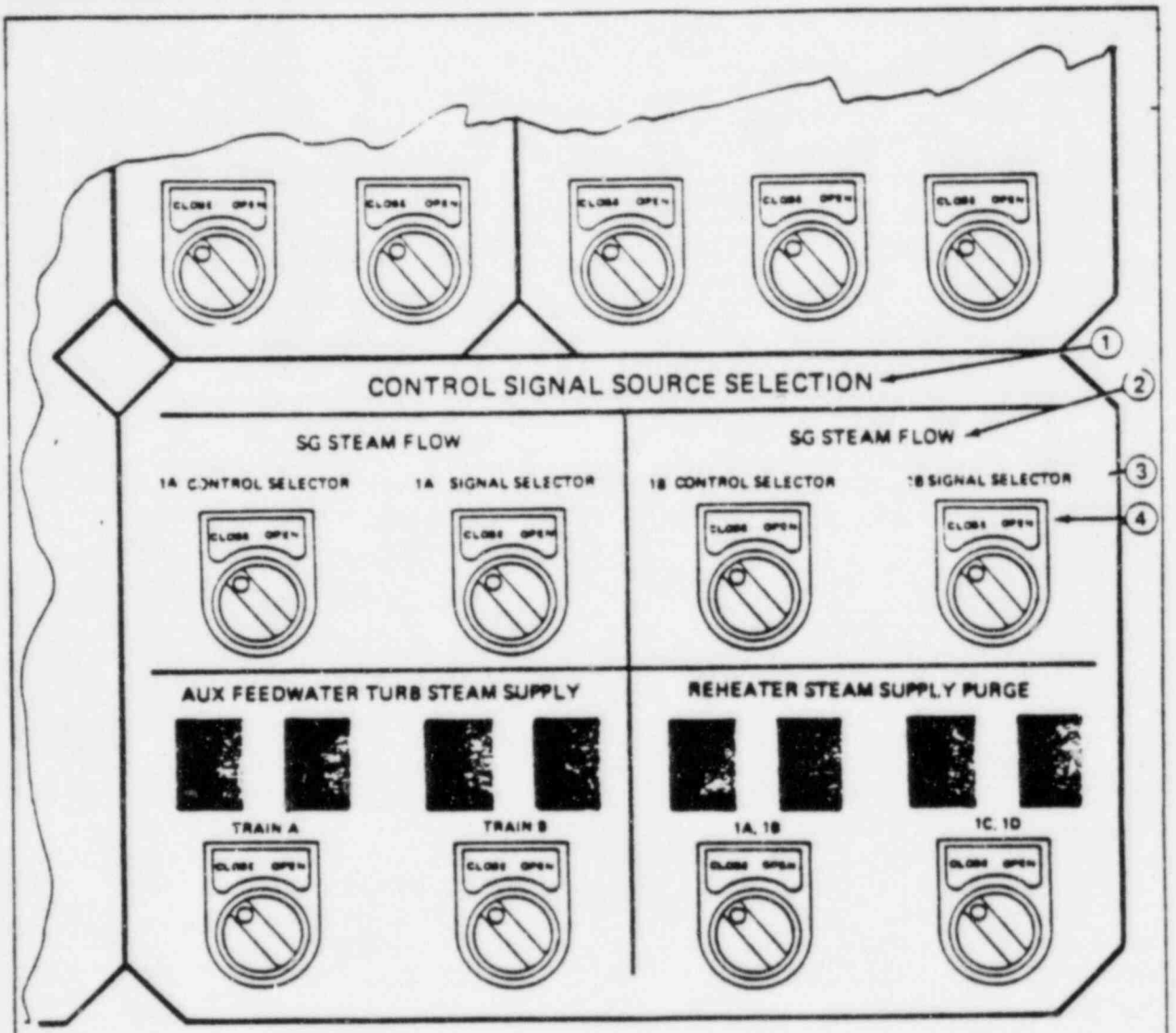


FIGURE 6-1. HIERARCHICAL LABELING SCHEME AND LABEL LOCATION.

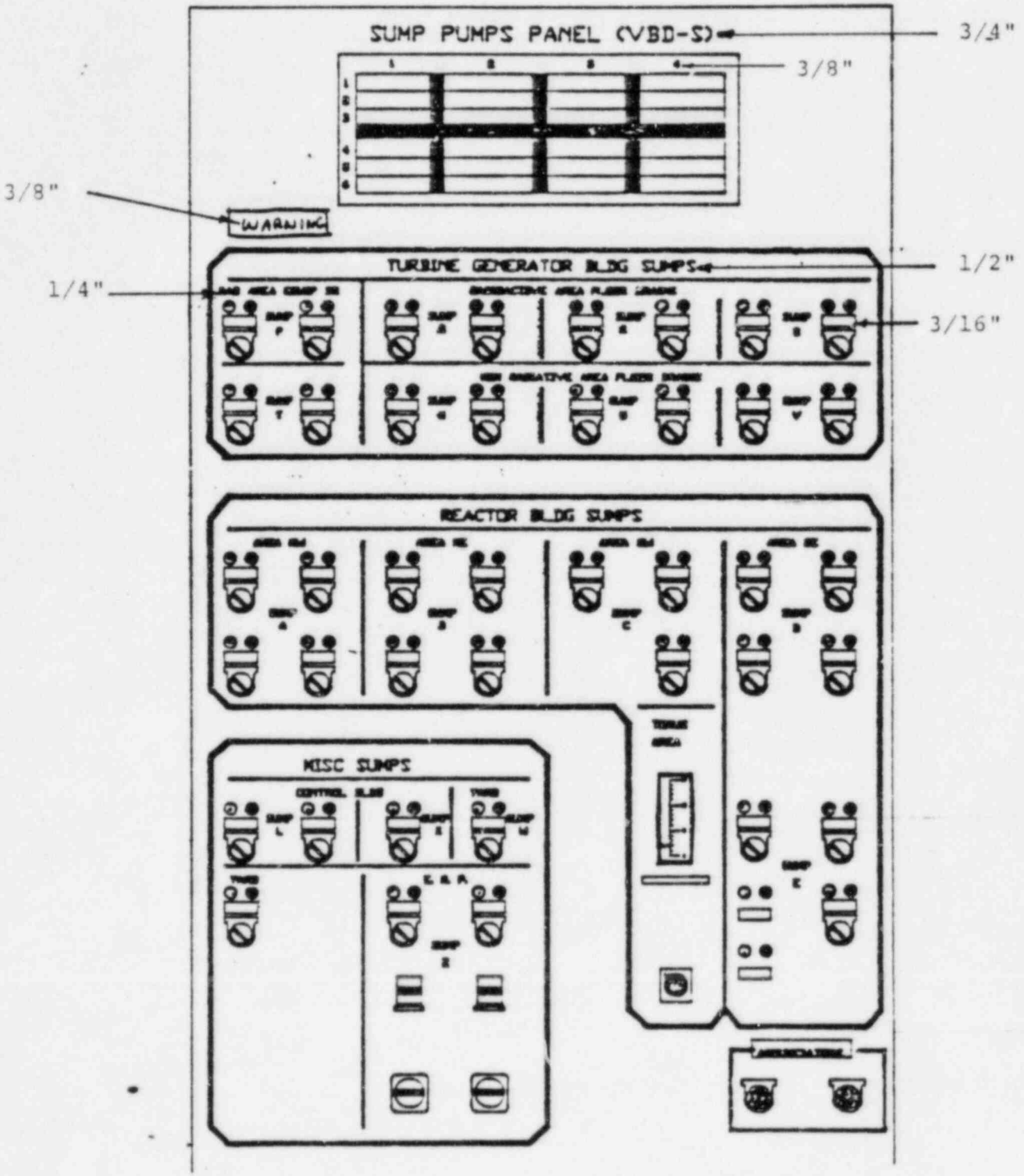


FIGURE 6-2. LABELING DIMENSIONS

5. Label Placement - Follow a consistent label placement rule. This relieves operators from uncertainty about which instrument a particular label identifies. To provide conformity in the control room, labels should always be placed below displays and above controls.

6. Review and Replace Informal Labeling - When needed information is lacking, operators tend to add informal labels and data to the boards. Such informal additions should be reviewed and replaced with formal labeling and placards consistent with the general labeling scheme of the control room.

6.4 REFERENCES

1. NUREG-0700, Guidelines for Control Room Design Reviews, NRC, August 1981.

2. EPRI NP-2411, Human Engineering Guide For Enhancing Nuclear Control Rooms, May 1982.

3. EPRI NP-3659, Human Factors Guide For NPP Control Room Development, August 1984.

7. COLOR CODING

7.1 GENERAL OBJECTIVE

Color coding can effectively supplement the labeling system by providing the operator with easily discriminable information. Color coding should be applied to indicators, annunciators, labels, mimics, CRT displays, and controls in a consistent manner that adds to the operator's understanding of the control boards and avoids visual clutter or "Christmas Tree" effects.

7.2 COLOR CODING PRINCIPLES

1. Consistency of Meaning - The meaning assigned to particular coding colors in the control room should ideally be consistent throughout the control room, i.e., red should have the same meaning on indicators, annunciators, CRT displays, mimics and labels.

2. Number of Colors Used For Coding - The number of colors used for coding purposes should be kept to the minimum needed for providing sufficient information. This number should not exceed eleven.

3. Meaning of Colors - Colors have assumed special associations in different contexts. For example, red for "stop" and green for "go" is universally observed in traffic systems. In military and space system workstations red is assigned to NO-GO, unsafe or dangerous conditions, green is reserved for safe, normal, or GO status. In the power industry, red indicators signify an activated or flow condition while green indicators are used to denote a no-flow or deactivated state. Regardless of the specific meanings assigned to colors, color coding conventions should be established and applied consistently within a given context.

4. Colors Selected For Coding Purpose - Code colors should be readily distinguishable, one from another. it should also be recognized that a segment of our population has color vision deficiencies. Table 7-1 lists 22 colors of maximum contrast with each other. The

first nine colors have been selected to yield maximum contrast for red-green deficient as well as normal color observers.

7.3 ENHANCEMENT STANDARDS AND IMPLEMENTATION GUIDELINES

The major problem faced by power plants in the area of color coding is that many inconsistencies were built into the originally designed control rooms. These inconsistencies cannot readily or completely be resolved on an enhancement or backfit basis. For example, the red/green code for indicator lights on the boards is at odds with the color coding for annunciators, the color coding of labeling, and vendor supplied off-the-shelf units. Consequently, red and green have many alternate meanings in the control rooms. With the addition of the SPDS to the control room there are further opportunities for color code inconsistencies. While it is not possible to fully optimize the present color coding scheme, the following measures will enhance the boards:

1) Establish Present Color Usage Practices - The existing use of color should be reviewed on a panel-by-panel basis. The meanings assigned to the various functions should be analyzed for consistency and adherence to initial design conventions. The additional needs of operators for color coded information should be determined.

2) Color Coding Enhancements - Table 7-2 summarizes the current use of color based on an initial survey and provides recommended changes to present coding practices. For indicator lights, the use of white, amber and blue colors in the control room should be standardized to indicate:

White: Normally illuminated, e.g., scram group A & B and Group Isolation signals.

Amber: Indicate onset of abnormal states or events. These flag the operator's attention to abnormalities, e.g., Relief Valve Low Pressure, Low Reactor Level.

Blue: System's bypass, e.g., Radwaste Bypass, Local Control Station Annunciators Bypassed.

TABLE 7-1

TWENTY-TWO COLORS OF MAXIMUM CONTRAST

Color Serial or Selection Number	General Color Name	ISCC-NBS ISCC-NBS Centroid Number	Color-Name (Abbreviation)	Munsell Renotation of ISCC-NBS Centroid Color
1	white	263	white	2.5PB 9.5/0.2
2	black	267	black	N 0.8/
3	yellow	82	v.Y	1.3Y 8.0/14.3
4	purple	218	s.P	6.5P 4.3/9.2
5	orange	48	v.O	4.1YR 6.5/15.0
6	light blue	180	v.l.B	2.7PB 7.9/6.0
7	red	11	v.R	5.0R 3.9/15.4
8	buff	90	gy.Y	4.4Y 7.2/3.8
9	gray	265	med. Gy	1.3GY 5.4/0.1
10	green	139	v.G	1.2G 4.9/11.1
11	purplish pink	247	a.p.PK	5.6RP 6.3/9.0
12	blue	178	s.B	2.9PB 4.1/10.4
13	yellowish pink	26	s.yPK	8.4R 7.0/9.5
14	violet	207	s.V	0.2P 3.7/10.1
15	orange yellow	66	v.OY	8.6YR 7.3/15.2
16	purplish red	255	s.pR	7.3RP 4.4/11.4
17	greenish yellow	97	v.gY	9.1Y 8.2/12.0
18	reddish brown	40	s.rBr	0.3YR 3.1/9.9
19	yellow green	115	v.YG	5.4GY 6.3/11.2
20	yellowish brown	75	deep yBr	8.8R 3.1/5.0
21	reddish orange	34	v.rO	9.8R 5.4/14.5
22	olive green	126	d.OIG	8.0GY 2.2/3.6

TABLE 7-2

PRESENT COLOR USAGE AND ENHANCEMENT STANDARDS

Component/Meaning	Present Color	Enhancement
Indicator Lights:		
o Valve Open	Red	
o Pump On	Red	
o Motor Running	Red	
o Breaker Closed	Red	
o Start	Red	
o Override (Drywell Fan Coils)	Red	
o Instrumentation Upscale High Trip	Red	Amber
o Valve Closed	Green	
o Pump Off	Green	
o Motor Off	Green	
o Breaker Open	Green	
o Stop	Green	
o Valve in Transition	Both Red & Green or Both Off	Adopt Both Red/ Green Convention For All Cases
o Local Control Station Annunciators Bypassed	Blue	
o SRVs in Operation	Blue	White
o Low Pressure on ADS & LLS Accumulators	Amber	
o Remote or Local Control of Generator Output Breakers	Amber	
o Equip Valve Ready	Amber	White
o Electrical Trips (86 Lockout)	White Light Goes Off	Provide Positive indication-Amber
o Main Generator Output Breakers Trip on Electrical Fault	White	Amber

TABLE 7-2 (CONT'D)

PRESENT COLOR USAGE AND ENHANCEMENT STANDARDS

Component/Meaning	Present Color	Enhancement
Annunciators		
o General Alarms & Advisory Information	White	
o RPS Trip Alarms & Entry To Emergency Per EOPs	Red	
o Alarms that Require Operator Action To Prevent Onset Of Red Alarms or Equipment Failure	Green	Amber
Meters		
o Scale Background; Except Yarway	White Green	 White
o Scale Banding:		
- Normal Zone	None	Green
- Off-Normal	None	Red Arrow
Labels		
o General Component	White-on-Black	
o Significant Components (Turbine Trip)	White-on-Red	
o Special Instructions, e.g., Bottom of Scale is 165" Above TAF.	White-on-Red	
o Cautions	Black-on-Amber	
o ESS Labels	Black-on-Amber White-on-Black White-on-Red	White-on-Black TBD
o Reset (For Loop A Initiation Logic)	White-on-Red	

TABLE 7-2 (CONT'D)

PRESENT COLOR USAGE AND ENHANCEMENT STANDARDS

Component/Meaning	Present Color	Enhancement
Functional Demarcation		
o Major System Divisions	Blue	
o Annunciator Controls Groupings	Orange	
o Critical Controls	Red	
Mimic Lines		
See Section 2		
Tags		
o Danger	Red-on-White	
Controls		
o Knobs	Generally Black, Silver, or Gold Yellow Knobs on Panel 9-3	

7.4 REFERENCES

1. NUREG-0700, Guidelines for Control Room Design Reviews, NRC, August 1981.

2. EPRI NP-2411, Human Engineering Guide for Enhancing Nuclear Control Rooms, May 1982.

3. EPRI NP-3659, Human Factors Guide For NPP Control Room Development, August 1984.

8. ANNUNCIATOR WARNING SYSTEM

8.1 GENERAL OBJECTIVE

A well designed annunciator warning system should:

- o Alert the operator to abnormal, unsafe, or out-of-tolerance plant conditions in a timely fashion allowing sufficient response time for remedial actions.

- o Provide information to operators in a format that will facilitate the correct diagnoses of off-normal events without creating a sensory overload problem.

- o Avoid needless distractions or inefficiencies caused by false annunciations, nuisance alarms, illegible window legends, or excessive visual scanning or alarm silencing.

8.2 ANNUNCIATOR WARNING SYSTEM DESIGN PRINCIPLES

An effective annunciator warning system should have the following attributes:

1. Set Points - The limits or set points for initiating alarms should be established in a manner that allows operators time to respond to off-normal conditions before a serious problem develops. However, the set points should not result in the frequent or excessive occurrence of alarms (termed "nuisance" alarms) that disrupt the operator's attention to his duties. Similarly, circuitry designs should be such that false alarms are avoided.

2. Dark Board Concept - The annunciator system should normally be unilluminated or dark. When an alarm is generated it should stand out against the otherwise dark annunciator panels.

3. General Alarms - Alarms that summarize a multitude of alarm conditions presented at local stations in the plant should be avoided unless an auxiliary operator is permanently stationed at the local panel or there is always sufficient time to dispatch an auxiliary operator to the local station.

4. Shared Alarms - Annunciators with inputs from more than one plant parameters should generally be avoided since they slow down operator response until he determines the specific problem that initiated the alarm. Similarly, HI/LO alerts on one window should be avoided when it important to distinguish between HI/LO conditions.

5. First-Out Annunciators - The initiating event associated with automatic plant shutdowns should be displayed on a first-out annunciator panel.

6. Prioritization - The numerous alarms presented in the control room should be prioritized in terms of significance so that operators can differentiate between high priority alarms and general advisory information. Priority coding is required to allow such differentiations.

7. Alarm Detection - Auditory alarms should be readily discernable above the ambient noise background (10db(A) above average) but not jarring or annoying. Auditory alarms should be coded or differentiated for different contexts, e.g., control console vs. computer-generated alarms. Localization cues that direct the operator's attention to the pertinent control console segment speed operator responses.

8. Location of Annunciators - Alarm displays should be located directly above related controls and displays on the control console. They should be grouped logically.

9. Matrix Labeling - Each annunciator matrix panel should have an identifying label. Each annunciator in a matrix should be identifiable by means of an alphanumeric code on the vertical and horizontal axes of the matrix. This code should be correlated with indexing for annunciator response procedures.

10. Lamp Replacement - Operators should be provided means for safe access to annunciator lamps for replacement of expended lamps precluding the possibility of falling on the controls or stepping on the apron section of the console. The possibility for inadvertently interchanging legend tiles should be eliminated.

11. Annunciator Readability - Annunciator legends should be readable from the console location where the acknowledge control is located. Letter height should be at least .004 x viewing distance. Lettering on all annunciators should be consistent in size and style, (see Labeling Section 6 recommendations).

12. Alarm Legend Terminology - Abbreviations and acronyms should be standardized and they should match those used elsewhere in the control room.

13. Cleared alarms - Distinctive audio and/or visual cues should be provided to inform the operator that an alarm has been cleared.

14. Annunciator Controls - Repetitive groups of annunciator controls should be similarly arranged and functionally demarcated. Shape coding should be considered for differentiating the ACKNOWLEDGE/SILENCE control from others. Operators should be discouraged from defeating the annunciator controls.

15. Arrangement of Annunciators - The organization of annunciators within a given matrix should be based on functional grouping and demarcation principles as discussed in Section 2. Figure 8-1 illustrates functional demarcation and hierarchical labeling as applied in enhancing existing annunciator panels.

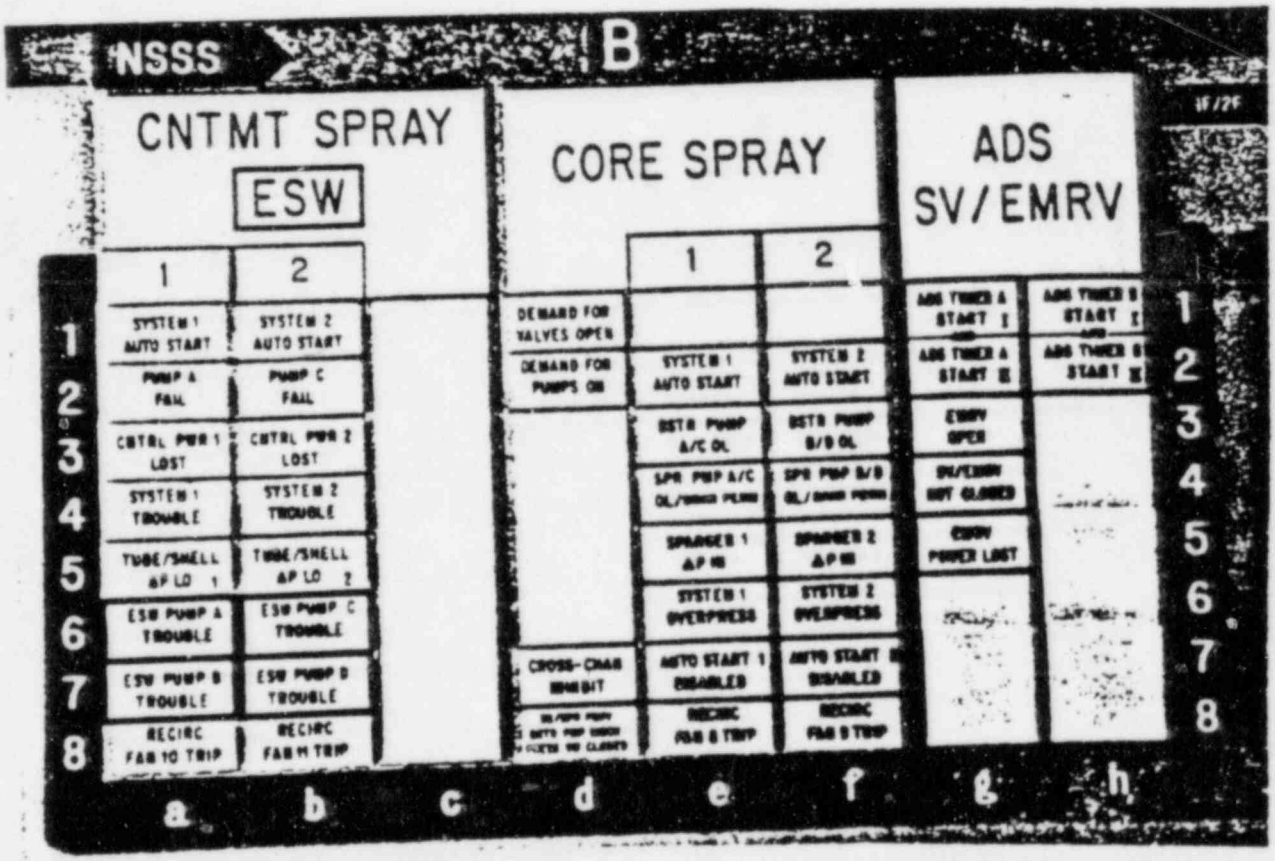


FIGURE 8-1. FUNCTIONAL GROUPING AND DEMARCATION AND HIERARCHICAL LABELING APPLIED IN ENHANCING ANNUNCIATOR PANELS (SOURCE EPRI NP-13486)

8.3 ENHANCEMENT STANDARDS AND IMPLEMENTATION GUIDELINES

1. Eliminate False or Nuisance Alarms - Adjust limits or set points for alarms that are constantly illuminated or which occur with excessive frequency in an unwarranted manner. Limits should be adjusted to provide a normally dark or unilluminated annunciator matrix array. True alarms that are initiated should contrast well against a dark panel.

2. Alarm Coding - Annunciator windows should be color coded according to importance. The most significant alarms should be coded red. Alarms of secondary importance should be coded amber (which is clearly distinguishable from white). Alarm windows that provide general advisory information should be white. If it is not possible to achieve the dark panel objective stated in (1) above, constantly illuminated alarm indications should be coded green.

3. Alarm Specificity - alarms with multiple inputs and ambiguous legends (e.g., Pressure HI/LO) should be modified if operator confusion or delays are caused. Separate alarm indications should be provided to a level of specificity that avoids operator response delays.

4. Matrix Labeling - Label the horizontal and vertical axes of annunciator panels to facilitate identification of specific alarm windows as illustrated in Figure 8-2. This identification scheme should correlate with the indexing code for annunciator response procedures. The annunciator location code should preferably be alphanumerical. Combining letters and numbers prevents confusion between rows and columns.

   Where existing procedures identify window locations by means of numerical codes along both the vertical and horizontal axes, the labeling shown as Figure 8.3 is required. This approach requires

ANNUNCIATOR PANEL LABEL

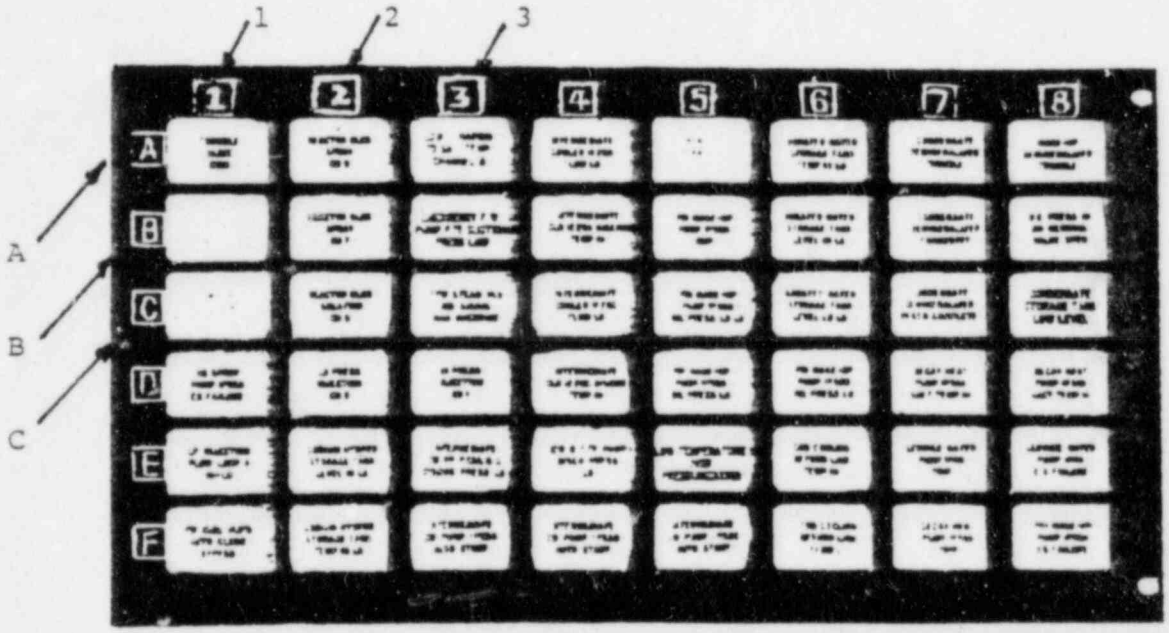


FIGURE 8-2. THIS ALARM PANEL HAS ROW AND COLUMN COORDINATE LABELS.

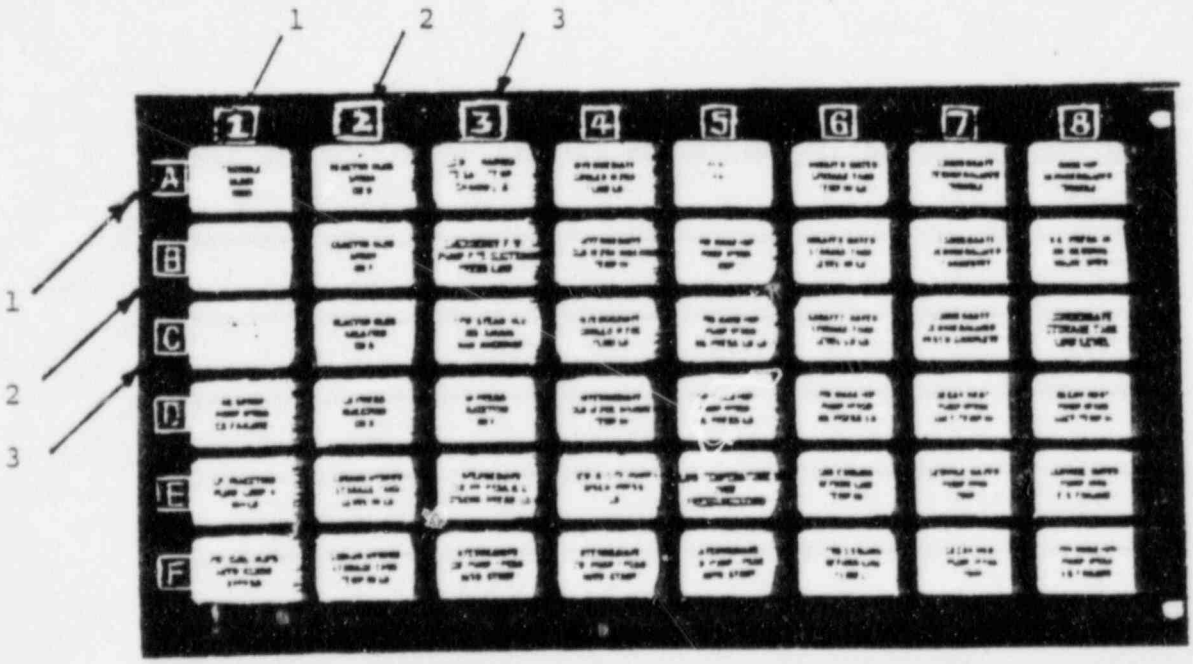


FIGURE 8-3. NUMBERS USED TO IDENTIFY BOTH ROWS AND COLUMNS.

careful training of operators to ensure that the first number of each pair (1-1, 1-2, 1-3, etc.) refers to the row and the second number designates columns location or vice versa. This less preferred alarm location code avoids the necessity of modifying alarm designations in all existing procedures.

5. Annunciator Controls - Where repetitive groups of annunciator controls are not organized in the same manner, shape coding is a valuable aid in differentiating the acknowledge, reset, and test buttoms. Figure 8-4 illustrates two dissimilar annunciator control configurations. Figure 8-5 illustrates the use of shape coding as an alternative to reorganizing discrepant control arrangements.

6. Access to Annunciator Lamps - A special ladder is required to provide access to annunciator panels for replacement of expended lamps, changing face legend plates, tagging and color coding of windows. The operator should be provided secure footing and the possibility of falling on to the apron section of the control should be precluded. The ladder shown in Figure 8-6 that extends panel over the apron section of the console offers greater stability than existing step-ladders currently utilized.

7. Annunciator Grouping - The organization of annunciator windows should be reviewed to ensure that they are logically placed in association with related panel components on the control boards. Where this is not the case, annunciators that are out of place should be relocated to the appropriate annunciator matrix.

8. Changing Annunciator Legend Plates - Caution should be exercised to ensure that annunciator legend plates are not inadvertently interchanged. Annunciator legend plates are not keyed to physically prevent such interchanges. One approach to avoiding incorrect substitutions is to code each window with regard to its

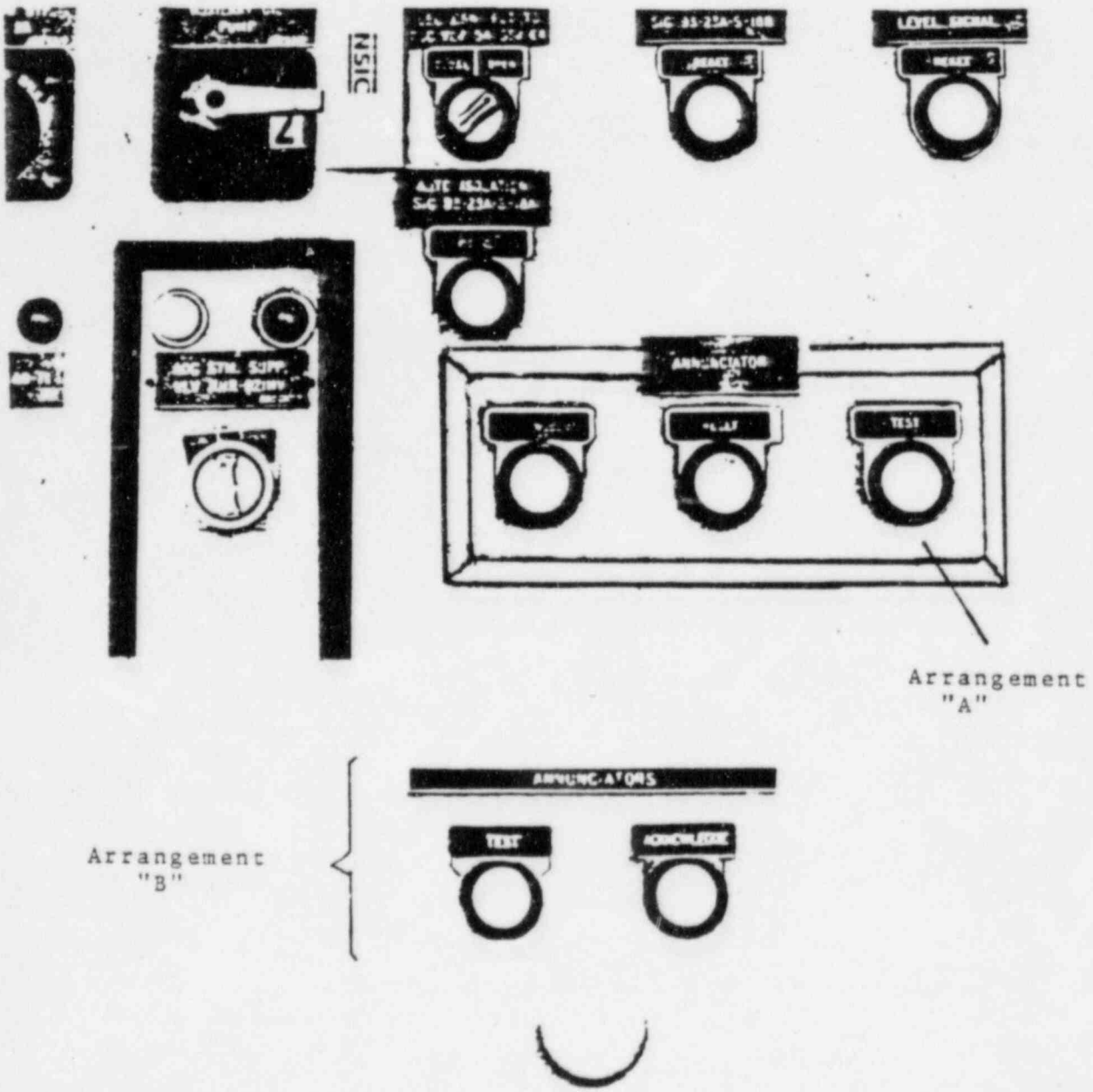


FIGURE 8-4. TWO DISSIMILAR ANNUNCIATOR CONTROL ARRANGEMENTS

FIGURE 8-5. TACTUALLY DISTINGUISHABLE SWITCHES FOR TEST, ACKNOWLEDGE, RESET, AND SILENCE. (SOURCE: EPRI NP-3448)

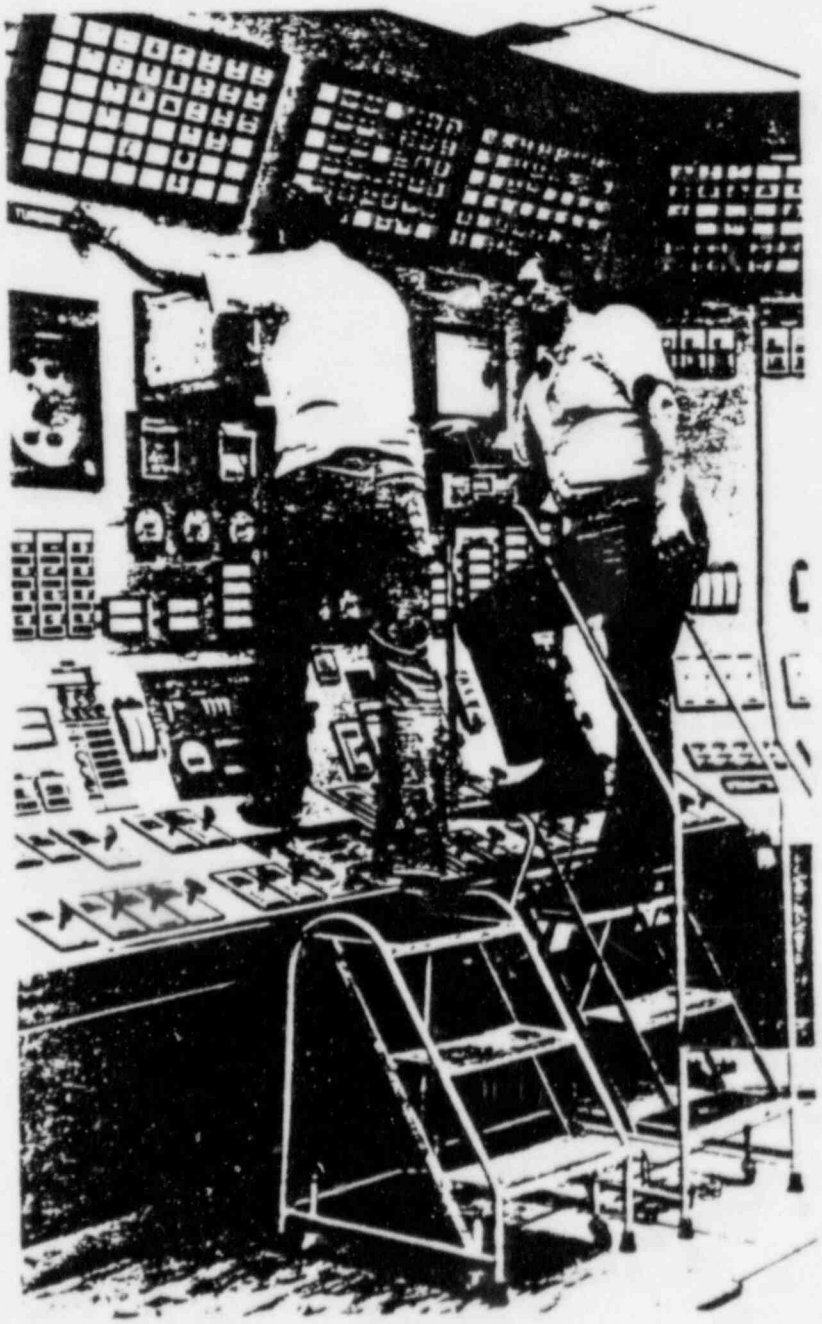


FIGURE 8-6. THE INAPPROPRIATE STEPLADDER ON THE LEFT FORCES THE USER TO RETAIN HIS BALANCE BY STANDING ON THE CONTROL PANEL. THE STEPLADDER ON THE RIGHT IS BETTER DESIGNED FOR MINIMIZING CONTACT WITH THE BOARDS. (SOURCE: EPRI NP-2411)

location in the matrix, e.g., A-1, A-2, A-3 in the lower lefthand corner of the legend plate. The code used should match the matrix code described above in (4).

A second approach is to institute administrative controls to ensure that two or more annunciator windows are not removed simultaneously. If windows are removed and replaced one at a time, there is no possibility for inadvertent interchanges.

9. Annunciator Legends - Standardized labeling practices should be observed for all annunciator legends. Label characters should be of the following dimensions:

Height:	TBD
Width:	TBD
Stroke Width:	TBD

Character style and abbreviations for new legends should be consistent with existing conventions.

8.4 REFERENCES

Further data relating to annunciator warning system enhancements is available in the follow references:

1. NUREG-0700, Guidelines for Control Room Design Reviews, Nuclear Regulatory Commission, August 1981.

2. EPRI NP-2411, Human Engineering Guide For Enhancing Nuclear Control Rooms, May 1982.

3. EPRI NP-3659, Human Factors Guide For Nuclear Power Plant Control Room Development, August 1984.

4. EPRI NP-1118, Human Factors Methods For Nuclear Control Room Design - Volume I: Human Factors Enhancement of Existing Nuclear Control Rooms, Nov. 1979, Volume II: Human Factors Methods For Conventional Control Board Design, Feb. 1980.

5. EPRI NP-3448, A Procedure For Reviewing and Improving Power Plant Alarm Systems, Volumes 1 and 2, April 1984.

9. CONTROL ROOM WORKSPACE

9.1 GENERAL OBJECTIVE

The control room should be designed to:

- Provide ready operator/supervisor visual and reach access to control boards, documentation, spares, etc.

- Limit access of non-operational personnel to the control room, in general, and the control boards, in particular.

- Ensure a satisfactory anthropometric fit between operators and work stations.

- Provide storage and easy access to operator protective equipment.

- Provide a habitable environment with good illumination (normal and emergency), noise control, adequate ventilation and temperature control, personal storage, and pleasant, professional decor.

9.2 CONTROL ROOM DESIGN PRINCIPLES

Control rooms designed to optimize the man-machine interface observe the following principles:

1) Accessibility of Controls and Displays - All displays and controls that relate to detection of abnormal safety-related conditions and that are needed to bring the plant to a safe shutdown condition should be in the primary operating area of the control room, i.e., there should be no necessity for the operator to access backpanel areas for critical displays or controls during transients.

2) Operator Workstations - Operator workstations should be located to provide an unobstructed view of the consoles. There should be no physical obstacles between the operator's desk and the control boards that would limit access to the boards.

3) Supervisor Station - Supervisor stations should be located within the primary area of the control room with good visual access to the boards and within easy voice reach distance from the operator's station.

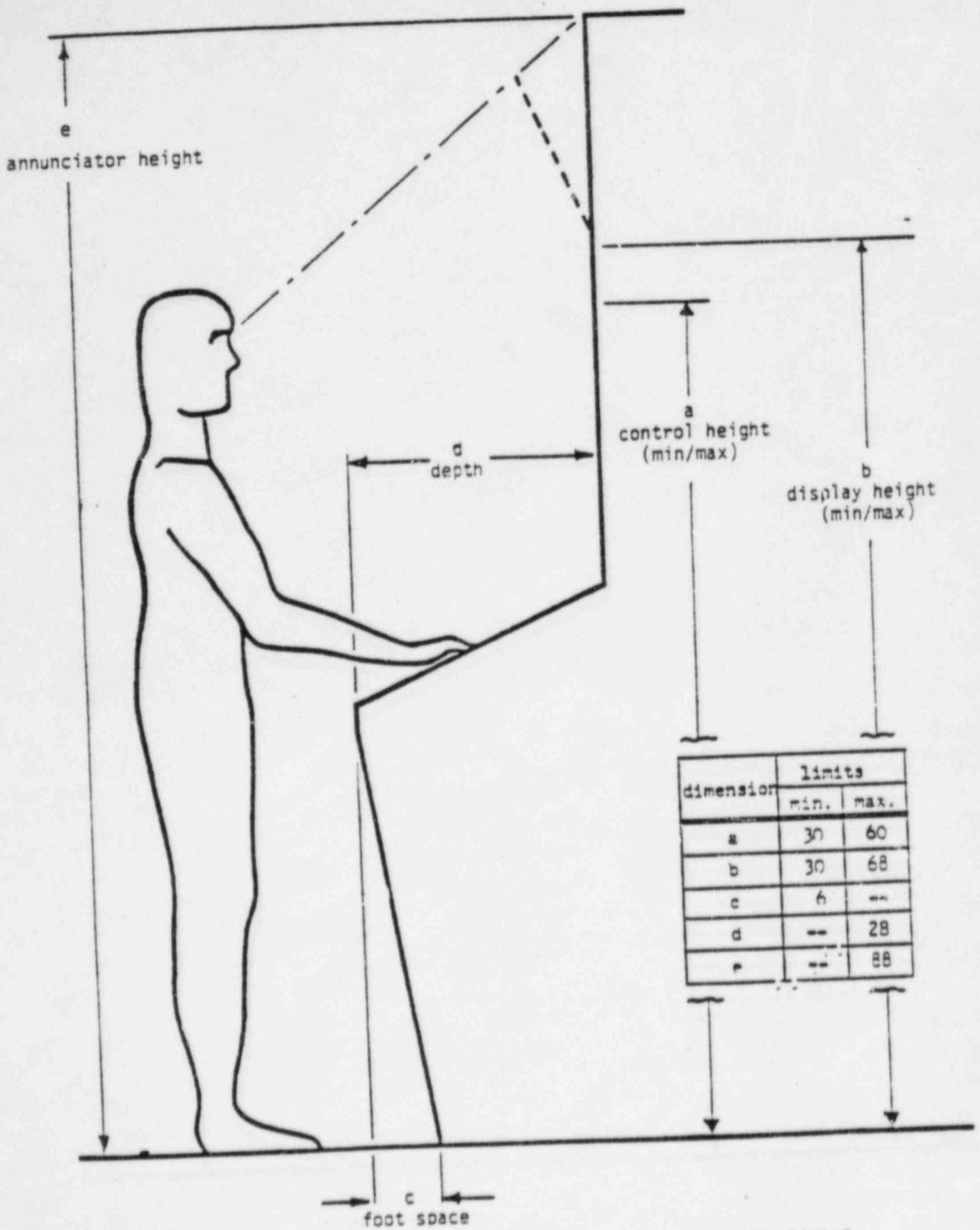
4) Workstation Laydown Space - Operator and supervisor desks should provide sufficient laydown space for paperwork and documents. Laydown provisions should be available for procedures use when the operator is positioned at the control boards.

5) Storage - The organization and storage of procedures, schematics, manuals, spares and tools should provide for ready access and easy, accurate retrieval. Documents should be protected from dirt and wear.

6) Access To Control Room - Access to the control room by nonessential personnel should be limited. Authorized, non-operational personnel movements in the control room should be directed away from the control boards or operator stations to the greatest extent possible.

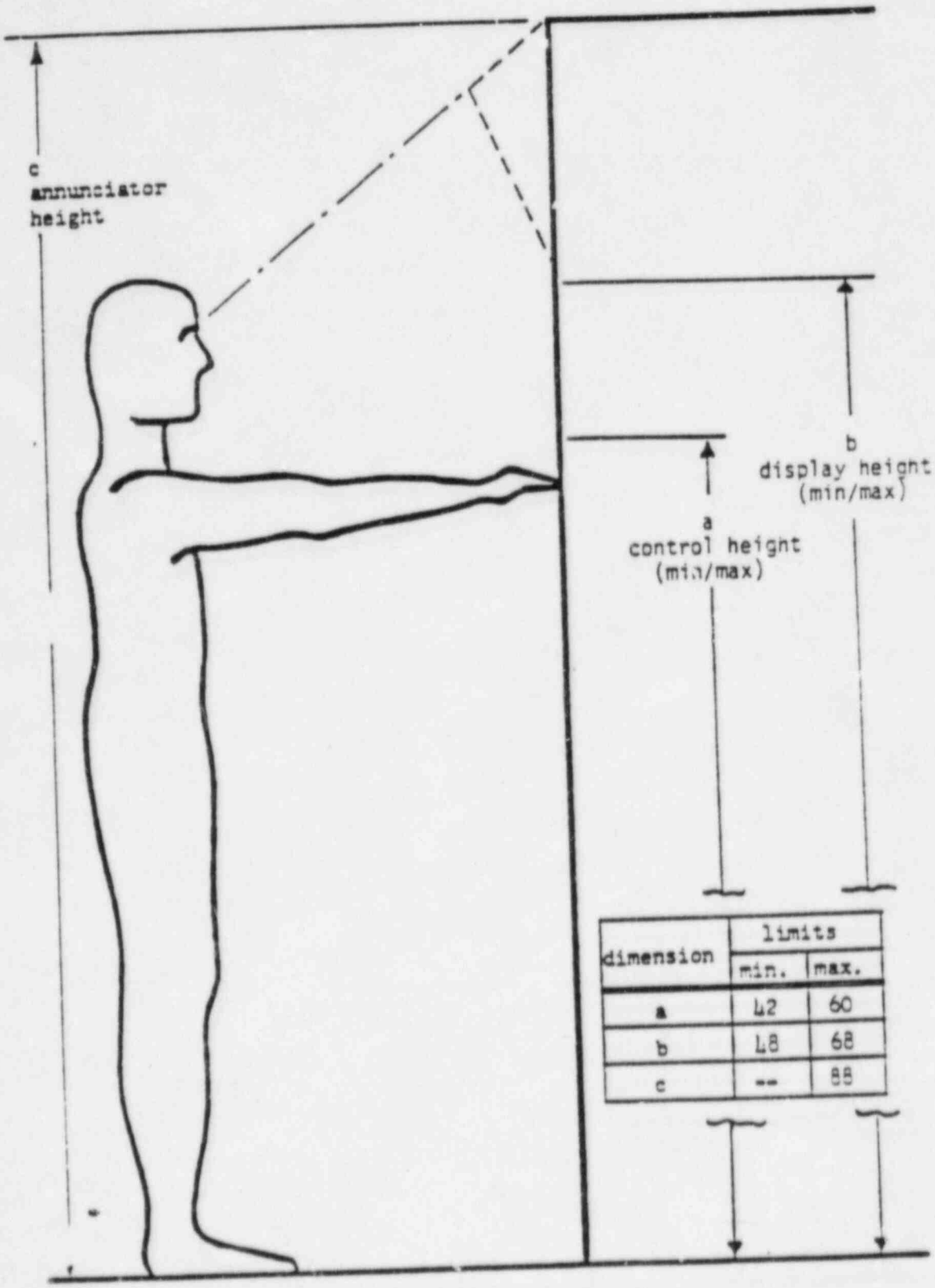
7) Anthropometrics - Controls and displays should be located for ease of use by operators. Figures 9-1, 9-2 and 9-3 indicate placement limits required to accomodate the 5th to 95th percentile range of operators.

8) Protective Gear - Protective gear and breathing apparatus that may be required for emergency use in the control room should be readily available, clearly marked, and sized for the operators on duty. Operators should be trained in the operation of the control boards while encumbered by protective gear. Protective gear shall allow for effective communications.



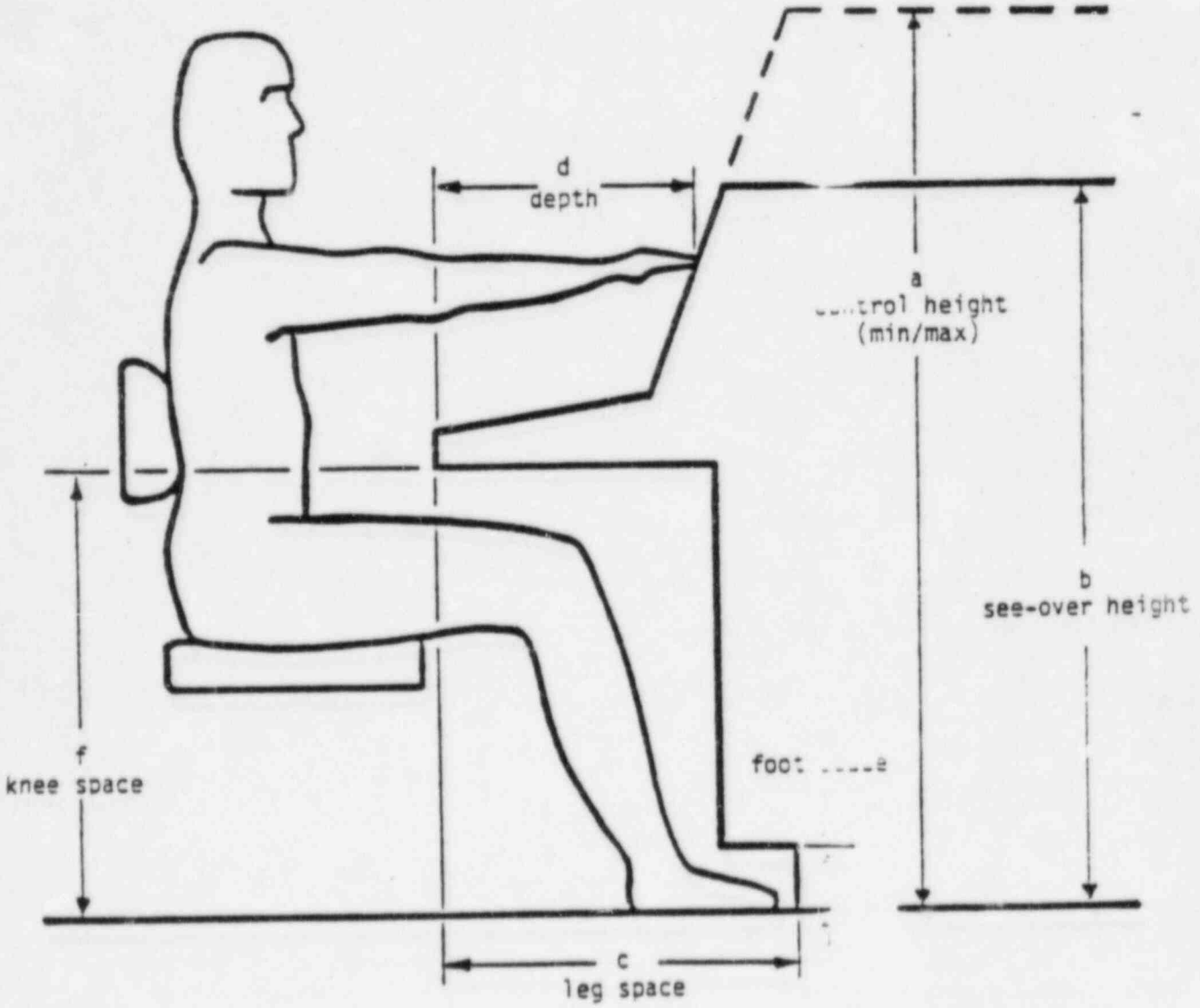
dimension	limits	
	min.	max.
a	30	60
b	30	68
c	6	--
d	--	28
e	--	88

FIGURE 9-1. ANTHROPOMETRIC REQUIREMENTS FOR BENCHBOARD PANELS



dimension	limits	
	min.	max.
a	42	60
b	48	68
c	--	88

FIGURE 9-2. ANTHROPOMETRIC REQUIREMENTS FOR VERTICAL PANELS



dimension	limits	
	min.	max.
a	25	54
b	--	42
c	24	--
d	--	25
e	4	--
f	25	--

FIGURE 9-3. ANTHROPOMETRIC REQUIREMENTS FOR SEATED CONSOLE OPERATION

9) Equipment - Temperature, humidity, and ventilation should be maintained to comfortable limits.

10) Illumination - Illumination levels should be sufficient for the accomplishment of specific tasks. Figure 9-4 provides guidelines for min-max illumination levels for normal and emergency operating lighting.

11) Glare and Reflections - The illumination system should not produce glare or reflections on instrument faces that interferes with readability.

12) Noise Environment - The auditory environment should allow for easy verbal communications, detection of alarms, and minimal distractions.

13) Habitability - Operators should be provided a pleasant, comfortable, professional work environment including provisions for storage of personal effects, convenient kitchen/toilet facilities, access to coffee and water, rest areas for auxiliary operators, and a pleasant decor.

9.3 ENHANCEMENT STANDARDS AND IMPLEMENTATION GUIDELINES

For major redesign or rearrangement of the control room, scale models, as shown in Figure 9-5, provide a useful tool for developing and assessing candidate enhancement approaches. Models will allow operators to select between alternative reconfiguration concepts. Models will also permit evaluation of:

- Design and arrangement of work stations, storage and laydown areas.
- Traffic pathways.
- Clearances between workstations and opposing surfaces.

Work Area or Type of Task	Task Illuminance, footcandles		
	Minimum	Recommended	Maximum
Panels, primary operating area	20	30	50
Auxiliary panels	20	30	50
Scale indicator reading	20	30	50
Seated operator stations	50	75	100
Reading:			
• Handwritten (pencil)	50	75	100
• Printed or typed	20	30	50
Writing and data recording	50	75	100
Maintenance and wiring areas	20	30	50
Emergency operating lighting	10	As above for area/task	

FIGURE 9-4. REQUIRED ILLUMINATION LEVELS

FIGURE 9-5. SCALE MODELS USED FOR CONTROL ROOM ENHANCEMENT PURPOSES

- o Methods for limiting unauthorized access to the boards.

- o Decor schemes and color/texture combinations

Full-scale mockups serve as highly useful design tools in developing new consoles or work stations for the control room or for major reconfigurations of existing consoles. If facility space is limited, half-scale mockups are an acceptable comprise.

Control room workspace enhancement guidelines are as follows:

1) Workstation Orientation - Orient operator workstations to provide a direct view of the portion of the control boards that each operator is overseeing.

2) Visibility From Supervisor's Station - The glass partitions that enclose the supervisor's workstation should be kept clear of paper or other items that serve to obstruct visibility of the control boards.

3) Limiting Access To the Boards - Ropes and stanchions should be available to be erected when it is necessary to limit or control the movement of non-operator personnel in the control room.

4) Print Storage and Use - Special storage cabinets for prints or schematics prevent wear and allow ready access for use. Prints protected by clear plastic overlays allow temporary notations that can be removed when no longer needed (see Figure 9-6).

5) Procedures Laydown - Rolling bookcases or carts provide convenient laydown surfaces that allow the operator to use procedures while operating the boards as shown in Figure 9-7.

6) Carpets - The addition of fire-proof or fire-resistant carpeting in the control room minimizes operator fatigue from standing, mutes

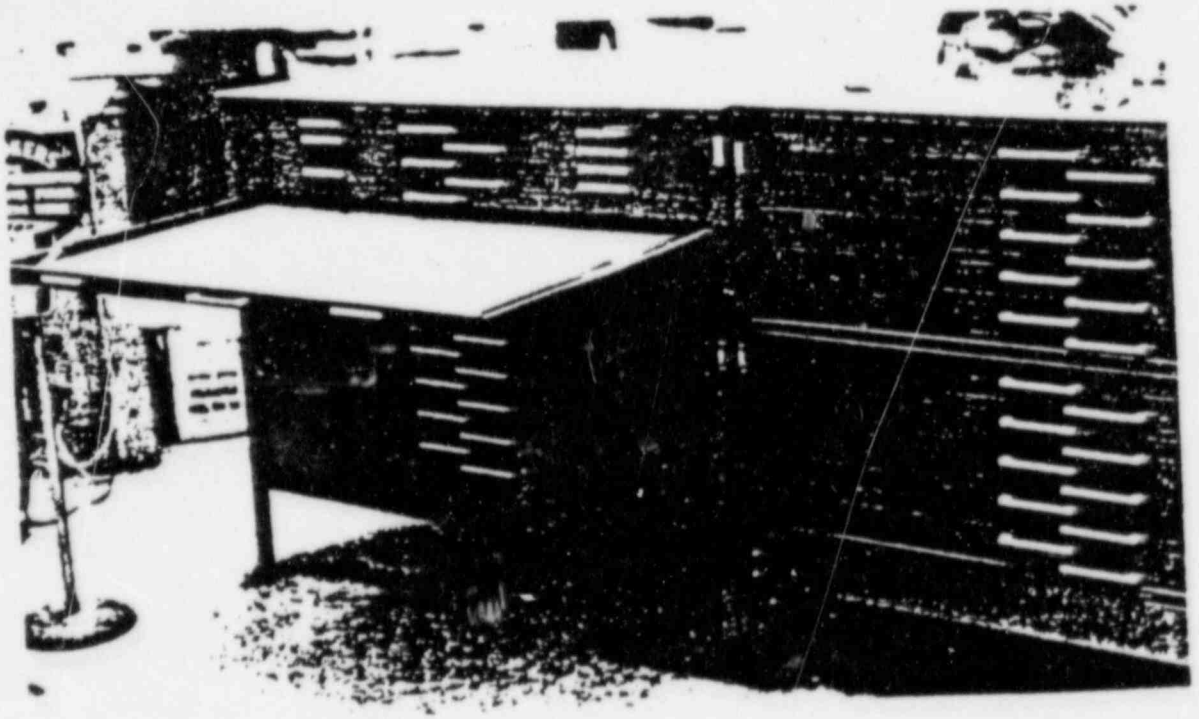


FIGURE 9-6. SPECIAL DEVICES FOR STORING AND DISPLAYING SCHEMATICS

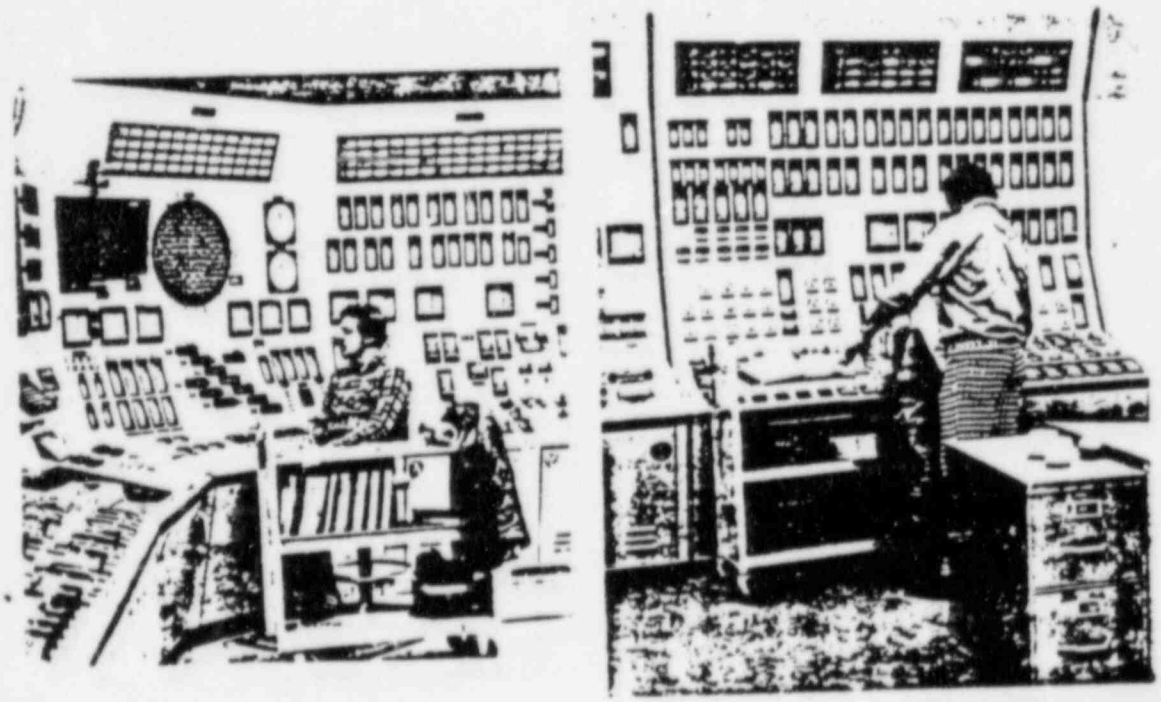


FIGURE 9-7. ROLLING BOOKCASE USED FOR PROCEDURES LAYDOWN WHILE OPERATING THE CONSOLES

noises, and improves general decor. Carpeting can be in combinations of varying, harmonious, colors to differentiate "no trespass" zones from general walking areas.

7) Decor and Furnishings - Operators typically describe their control rooms as drab and dingy (EPRI NP-309). The negative effects of confinement for long hours in the control room can be alleviated by stimulating wall color schemes, textures, wall graphics, paneling, and similar features designed to high standards of interior design. The quality of work stations, storage cabinets and other furnishings also contributes to the overall decor of the control room.

8) Anthropometric Problem Resolution - Where controls or displays are placed far beyond the limits provided in Figures 9-1, 9-2 and 9-3, relocation to more favorable locations should be considered especially in cases of safety-related panel components. However, relocation of panel elements often means that they will be extracted from logical groupings and moved to areas that are not functionally related to the elements in question. Therefore, relocations should be performed with consideration of potentially counterproductive rearrangements. One expedient for accessing panel elements placed above authropometric limits is a front stool as shown in Figure 9-8. It should, however, be noted that such footstools may serve as obstacles when operators are moving about the boards under stressful conditions.

FIGURE 9-8. FOOT STOOL USED FOR ACCESS TO HIGHLY PLACED DISPLAYS

9.4 REFERENCES

1. EPRI NP-309, Human Factors Review of Nuclear Power Plant control Rooms, March 1977.

2. NUREG-0700, Guidelines for Control Room Design Reviews, Nuclear Regulatory Commission, August 1981.

3. EPRI NP-3659, Human Factors Guide For Nuclear Power Plant Control Room Development, August 1984.

ATTACHMENT A

A.1 CNS STANDARD ABBREVIATION LIST

A.2 CNS STANDARD PROCESS UNIT LIST

ATTACHMENT A.1

CNS STANDARD ABBREVIATION LIST

ABBREVIATION	DEFINITION
ADMIN BLDG	ADMINISTRATION BUILDING
ACAD	ATMOSPHERIC CONTAINMENT ATMOSPHERE DILUTION
ACCUM	ACCUMULATOR
A/C	AIR CONDITIONER
AD	AIR DAMPER
ADS	AUTOMATIC DEPRESSURIZATION SYSTEM
ANN	ANNUNCIATOR
AO	AIR OPERATOR
AOG	AUGMENTED OFF GAS
AOP	ABNORMAL OPERATING PROCEDURE
AOV	AIR OPERATED VALVE
APRM	AVERAGE POWER RANGE MONITOR
AR	AIR REMOVAL
ARM	AREA RADIATION MONITOR
AS	AUXILIARY STEAM
ASB	AUXILIARY STEAM BOILERS
ATWS	ANTICIPATED TRANSIENT WITHOUT SCRAM
B	BOILER
BATT	BATTERY
BATT-CHG	BATTERY CHARGER
BLDG	BUILDING
BLWR	BLOWER
BPV	BYPASS VALVE
BUS	BUSWORK
CAM	CONSTANT AIR MONITOR
CE	CONDUCTIVITY ELEMENT
CENT	CENTRIFUGE
CI	CONDUCTIVITY INDICATOR
CIT	CONDUCTIVITY INDICATOR TRANSMITTER
CKT BKR	CIRCUIT BREAKER
CM	CONDENSATE MAKEUP
CNDR	CONDENSER
COMP	COMPRESSOR
CONT	CONTROLLER
CONT BLDG	CONTROL BUILDING
CO2	CARBON DIOXIDE
CP	PROCESS COMPUTER
CPU	CENTRAL PROCESSING UNIT
CR	CONDUCTIVITY RECORDER
CR	CONTROL ROD
CRD	CONTROL ROD DRIVE
CS	CORE SPRAY
CSCS	CORE STANDBY COOLING SYSTEM
CT	COOLING TOWER
CV	CHECK VALVE
CVTR	CONVERTER
CW	CIRCULATING WATER

D	DIESEL
DA	DEAERATOR
DG	DIESEL GENERATOR
DEH	DIGITAL ELECTRO-HYDRAULIC CONTROL
DEMIN	DEMINERALIZER
DFR	DIFFERENTIAL FLOW RECORDER
DG	DIESEL GENERATOR
DGDO	DIESEL GENERATOR FUEL OIL
DGJW	DIESEL GENERATOR JACKET WATER
DGLO	DIESEL GENERATOR LUBE OIL
DGSA	DIESEL GENERATOR STARTING AIR
dp	DIFFERENTIAL PRESS
DPC	DIFFERENTIAL PRESSURE CONTROLLER
DPI	DIFFERENTIAL PRESSURE INDICATOR
DPIC	DIFFERENTIAL PRESSURE INDICATOR CONTROLLER
DPIS	DIFFERENTIAL PRESSURE INDICATOR SWITCH
DPR	DIFFERENTIAL PRESSURE RECORDER
DPS	DIFFERENTIAL PRESSURE SWITCH
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
DSC	DISCONNECT SWITCH
DTIS	DIFFERENTIAL TEMPERATURE INDICATING SWITCH
DTT	DIFFERENTIAL TEMPERATURE TRANSMITTER
DW	DEMINERALIZED WATER
DW	DRYWELL
EE	ELECTRICAL EQUIPMENT
EHC	ELECTRO-HYDRAULIC CONTROL
EHOV	ELECTRO-HYDRAULIC OPERATED VALVE
EHO	ELECTRO-HYDRAULIC OPERATOR
ELEM	ELEMENT
ELEV	ELEVATOR
EOP	EMERGENCY OPERATING PROCEDURE
EP	ELECTRO-PNEUMATIC CONVERTER
EPG	EMERGENCY PROCEDURE GUIDELINES
ERP	ELEVATED RELEASE POINT
ES	EXTRACTION STEAM
EXC	EXCITER
EXT	EXTINGUISHER
FAN	FAN
FC	FLOW CONTROLLER
FCU	FAN COIL UNIT
F/D	FILTER DEMINERALIZER
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIC	FLOW INDICATING CONTROLLER
FIS	FLOW INDICATING SWITCH
FLTR	FILTER
FP	FIRE PROTECTION
FPC	FUEL POOL DIESEL COOLING & CLEANUP
FR	FLOW RECORDER
FREQ MTR	FREQUENCY METER
FS	FLOW SWITCH
FT	FLOW TRANSMITTER

GEN	GENERATOR
GOV	GOVERNOR
H2	HYDROGEN
HCU	HYDRAULIC CONTROL UNIT
HO	HYDRAULIC OPERATOR
HOV	HYDRAULICALLY OPERATED VALVE
HMD	HUMIDIFIER
HPCI	HIGH PRESSURE COOLANT INJECTION
HTR	HEATER
HX, HT EX	HEAT EXCHANGER
H&V, HV	HEATING AND VENTILATION
HVAC	HEATING, VENTILATING, & AIR CONDITIONING
I	INDICATOR
IA	INSTRUMENT AIR
IC	INTERCOMMUNICATION
IRM	INTERMEDIATE RANGE MONITOR
IS	INTAKE STRUCTURE
IVTR	INVERTER, STATIC INVERTER
LA	LEVEL ALARM
LC	LEVEL CONTROLLER
LCO	LIMITING CONDITION FOR OPERATION
LE	LEVEL ELEMENT
LG	LEVEL GLASS
LI	LEVEL INDICATOR
LIC	LEVEL INDICATOR CONTROLLER
LIS	LVEL INDICATING SWITCH
LIT	LEVEL INDICATOR TRANSMITTER
LITS	LEVEL INDICATOR TRANSMITTER SWITCH
LMT SW	LIMIT SWITCH
LO	LUBE OIL
LOCA	LOSS-OF-COOLANT ACCIDENT
LOGCAL	LOG CALIBRATION UNIT
LOGS	LUBE OIL, GENERATOR SEAL (INSTRUMENTS)
LOGT	LUBE OIL, TURBINE (INSTRUMENTS)
LPCI	LOW PRESSURE COOLANT INJECTION
LPRM	LOCAL POWER RANGE MONITOR
LR	LOCAL RACKS
LR	LEVEL RECORDER
LRS	LEVEL RECORDER SWITCH
LS	LEVEL SWITCH
LSS	LEVEL SELECTOR SWITCH
LT	LEVEL TRANSMITTER
LTG	LIGHTING
LVDT	LINEAR VARIABLE DIFFERENTIAL TRANSFORMER

MA	MANUAL AUTO STATION
MC	MAIN CONDENSATE SYSTEM
MCC	MOTOR CONTROL CENTER
ME	MOISTURE/HUMIDITY ELEMENT
MEM	MEMORY DISK
MG	MOTOR GENERATOR
MI	METEOROLOGICAL INSTRUMENTS
MO	MOTOR OPERATOR
MON	MONITOR
MOS	MOTOR OPERATED STRAINER
MOT	MOTOR
MOV	MOTOR OPERATED VALVE
MS	MAIN STEAM
MSIV	MAIN STEAMLINE ISOLATION VALVE
MSPR	MOISTURE SEPARATOR
MTR	MAGNETIC TAPE RECORDER
MVI	MILLIVOLT TO CURRENT TRANSMITTER
MVPOT	MILLIVOLT POTENTIOMETER
N2	NITROGEN
NB	NUCLEAR BOILER
NBI	NUCLEAR BOILER INSTRUMENTATION
NM	NEUTRON MONITORING
NMA	NEUTRON MONITORING (APRM)
NMF	NEUTRON MONITORING (FLOW UNIT)
NMI	NEUTRON MONITORING (IRM)
NML	NEUTRON MONITORING (LPRM)
NMR	NEUTRON MONITORING (RBM)
NMS	NEUTRON MONITORING (SRM)
NMT	NEUTRON MONITORING (TIP)
NPSH	NET POSITIVE SUCTION HEAD
NRC	NUCLEAR REGULATORY COMMISSION
NRHX	NONREGENERATIVE HEAT EXCHANGER
NRV	NONRETURN VALVE
OG	OFFGAS
OST	OVERSPEED TRIP
PASS	POST ACCIDENT SAMPLING SYSTEM
PC	PRIMARY CONTAINMENT
PC	PRESSURE CONTROLLER
PCIS	PRIMARY CONTAINMENT ISOLATION SYSTEM
PCV	PRESSURE CONTROL VALVE
PI	PRESSURE INDICATOR
PIC	PRESSURE INDICATOR CONTROLLER
PIS	PRESSURE INDICATOR SWITCH
PMIS	PLANT MANAGEMENT INFORMATION SYSTEM
POS	POSITIONER
POSI	POSITION INDICATOR

PNL	PANEL
PMP	PUMP
PR	PRESSURE RECORDER
PRV	PRESSURE REGULATING/REDUCING VALVE (SELF ACTUATING)
PS	PRESSURE SWITCH
PT	PRESSURE TRANSMITTER
RA	RADIATION ALARM
RBM	ROD BLOCK MONITOR
RCIC	REACTOR CORE ISOLATION COOLING
RCMB	RECOMBINER
RCDR	RECORDER
RCVR	RECEIVER
RE	RADIATION ELEMENT
REC	REACTOR EQUIPMENT COOLING
RF	REACTOR FEEDWATER
RFC	REACTOR FEEDWATER CONTROL
RFLO	REACTOR FEEDWATER PUMP & TURBINE LUBE OIL
RFP	REACTOR FEEDWATER PUMP
RHR	RESIDUAL HEAT REMOVAL
RHX	REGENERATIVE HEAT EXCHANGER
RM	RADIATION MONITOR
RMA	RADIATION MONITORING (AREA)
RMC	REACTOR MANUAL CONTROL
RMC	REMOTE MANUAL CONTROL STATION
RMCS	REACTOR MANUAL CONTROL SYSTEM
RMP	RADIATION MONITORING (PROCESS)
RMS	ROOT MEAN SQUARE
RMV	RADIATION MONITORING (VENT)
RO	RESTRICTION ORIFICE
RPIS	ROD POSITION INFORMATION SYSTEM
RPS	REACTOR PROTECTION SYSTEM
RPV	REACTOR PRESSURE VESSEL
RR	REACTOR RECIRCULATION
RRLO	REACTOR RECIRCULATION (LUBE OIL)
RRFC	REACTOR RECIRCULATION (FLOW CONTROL)
RRMG	REACTOR RECIRCULATION (MG SET)
RSCS	ROD SEQUENCE CONTROL SYSTEM
RV	RELIEF VALVE
RW	RADWASTE
RWCU	REACTOR WATER CLEANUP
RWM	ROD WORTH MINIMIZER
RX	REACTOR
RX BLDG	REACTOR BUILDING

SA	SERVICE AIR
SBGT	STANDBY GAS TREATMENT
SD	SMOKE DETECTOR
SDV	SCRAM DISCHARGE VOLUME
SE	SPEED ELEMENT
SEIS	SEISMIC SUPPORT
SEP	SEPARATOR
SI	SPEED INDICATOR
SIC	SPEED INCIATING CONTROL
SJAE	STEAM JET AIR EJECTOR
SLC	STANDBY LIQUID CONTROL
SNUB	SNUBBER
SOL	SOLENOID
SORV	STUCK-OPEN RELIEF VALVE
SOV	SOLENOID OPERATED VALVE
SPKR	SPEAKER
SQRT	SQUARE ROOT CONVERTER
SRM	SOURCE RANGE MONITOR
SRV	SAFETY/RELIEF VALVE
STM TUN	STEAM TUNNEL
STNR	STRAINER
STR	STARTER
SV	SAFETY VALVE
SW	SERVICE WATER
SW	SWITCH
SWGR	SWITCHGEAR
SYNC	SYNCHROSCOPE
TAF	TOP OF ACTIVE FUEL
TC	TEMPERATURE CONTROLLER
TDR	TEMPERATURE DELAY RELAY
TE	TEMPERATURE ELEMENT
TEC	TURBINE EQUIPMENT COOLING
TG	TURBINE GENERATOR
TGC	TURBINE GENERATOR EH CONTROL
TGF	TURBINE GENERATOR EH FLUID
TGI	TURBINE GENERATOR SUPERVISORY INSTRUMENT
TI	TEMPERATURE INDICATOR
TIC	TEMPERATURE INDICATING CONTROL
TIMER	TIMER
TIP	TRAVERSING INCORE PROBE
TIS	TEMPERATURE INDICATING SWITCH
TK	TANK
TR	TRANSFORMER INSTRUMENTS
TR	TEMPERATURE RECORDER
TS	TEMPERATURE SWITCH
TSC	TECHNICAL SUPPORT CENTER

ABBREVIATION LIST (CONT)

TURB	TURBINE
TURB BLDG	TURBINE BUILDING
TURN-GR	TURNING GEAR
VLV	VALVE
VENT	VENTILATOR
VES	VESSEL
VBE	VIBRATION ELEMENT
VBI	VIBRATION INDICATOR
VBS	VIBRATION SWITCH
VI	VOLTAGE INDICATOR
VIB	VIBRATOR
VRG	VOLTAGE RETULATOR
WT	WATER TREATMENT
XFMR	TRANSFORMER
YD	YARD

ATTACHMENT A.2

CNS STANDARD PROCESS UNIT LIST

Abbreviation	Definition
AC	Alternating Current
Btu	British Thermal Unit
C	Centigrade
cc	Cubic centimeter
Ci	Curie
CM	Centimeter
Cu	Cubic
DC	Direct Current
dP	Differential pressure
F	Fahrenheit
ft	Foot
gal	Gallon
gpm	Gallons per minute
Hg	Mercury
hp	Horse power
hr	Hour
in.	Inch
KVAR	Kilovolt Amperes Reactive
kW	Kilowatt
lb	Pound
min	Minute
mrem	Millirem
mr	Milliroentgen
MW	Megawatt
MWE	Megawatt Electric
MWT	Megawatt Thermal
N_2	Nitrogen
ppb	Parts per Billion
ppm	Parts per Million
psia	Pounds per square inch (absolute)
psig	Pounds per square inch (gauge)
R	Roentgen
rem	Roentgen equivalent man
rpm	Revolutions per minute
scf	Standard cubic ft
scfm	Standard cubic foot per minute
sec	Second
sq	Square
V	Volt
VAC	Voltage - Alternating Current
VDC	Voltage Direct Current
W	Watt

APPENDIX F

VERIFICATION OF DESIGN IMPROVEMENTS

I. PURPOSE

The purpose of this instruction is to establish a procedure for Verifying, Validating and implementing control room modifications required to correct Human Engineering Discrepancies (HEDs). These discrepancies were identified by the Detailed Control Room Design Review (DCRDR) Team and are documented in Appendix B of Reference (A), "Cooper Nuclear Station DCRDR Summary Report", dated February 4, 1985.

II. DEFINITIONS

A. Design Change.

Design Change (DC) is defined in Reference (B), CNS Engineering Procedure 3.4, "Station Design Changes". For the purpose of this instruction all HEDs listed in Appendix B of Reference (A) are considered DCs and will be corrected using the DC process.

B. Verification.

For the purpose of this instruction, Verification is composed of two separate but interrelated activities, these are:

1. Confirmation that all requirements of Reference B have been incorporated into the DC.

2. Confirmation that all reasonably achievable "Cooper Nuclear Station Control Room Human Factors Engineering Standards and Implementation Guidelines", Reference C have been incorporated into the DC.

C. Validation.

Validation is the review of the DC package in accordance with this instruction, by a group of multi-disciplined and experienced NPPD personnel (the DCRDR Team) to ensure that all reasonably achievable Reference C standards have been incorporated into the DC and that there are no unacceptable consequences generated as a result of the DC.

III. SCOPE

A. This instruction is applicable to:

1. All DCs prepared to correct HEDs.

2. All existing DCs not yet implemented or future DCs which may effect the operator/machine interface of control room panels or the control room environment.

3. This instruction is self cancelling at the conclusion of the DCRDR Program or dissolution of the DCRDR Team.

IV. RESPONSIBILITIES

A. NSD DCRDR Project Manager.*

1. Arranges Design Engineer support for the preparation of DCRDR DCs.

2. Schedules DCRDR DC preparation.

3. Administers the DCRDR DC numbering system.

B. Design Engineer.

1. Prepares the DC.

2. Incorporates human factors engineering standards into the DC.

3. Submits the DC to the DCRDR Team for Validation.

C. Independent Design Verifier.

1. Independently Verifies the DC in accordance with Reference B.

---

*Currently the NSD Senior Staff Engineer - R. D. Boyle

2. Verifies that sound human factors engineering has been incorporated into the DC.

D. DCRDR Team.

1. Ensures all HEDs have been forwarded to the NSD, DCRDR Project Manager and that the description of each is adequate for DC preparation.

2. Conducts a preliminary review and approval of conceptual Control Room design changes when requested.

3. Validates the DC.

E. CNS Technical Manager.

1. Ensures that any Control Room DC generated outside the DCRDR Program, which may effect the Control Room operator/machine interface or the Control Room environment, is Verified and Validated in accordance with this instruction.

F. CNS Operations Manager.

1. Schedules approved DCRDR DCs for implementation in an expeditious manner guided by Reference A and consistent with the operational commitments of Cooper Nuclear Station.

G. CNS Maintenance Planner/Scheduler.

1. Schedules the approved DCRDR Program DC as requested by the Operations Manager.

V. PROCEDURE

A. The NSD, DCRDR Project Manager will have Design Engineers assigned to prepare DCs required to support the DCRDR Program. Assignment will be made in accordance with procedures in Reference (B).

To facilitate administrative and clerical control of the DCRDR Program DCs, DC Number 85-15 has been assigned to the Program and is the "overview" document for the Program. This number plus a letter suffix will be used to identify each subordinate DC. When required, revisions and amendments may be made to subordinate DCs in accordance with Section V of Reference (B). The NSD, DCRDR Project Manager will ensure that the proper numbering standard is followed.

B. The Design Engineer will prepare DCRDR DCs following the procedures in Section III of Reference (B).

In addition the Design Engineer will ensure:

1. That the DC incorporates to the greatest extent that is reasonably achievable the CNS Human Factors Engineering Standards specified in Reference C.

   When incorporating the Reference C Standards the Design Engineer must take into consideration the physical restraints and limitations imposed by the configuration of the existing Control Room and its equipment.

   (If the Design Engineer is concerned that CNS Human Factor Engineering Standards may not be adequately incorporated into the design, he should prepare a conceptual design change for preliminary review and approval by the DCRDR Team.)

2. That the DC is submitted to the DCRDR Team for Validation prior to being submitted to SORC.

C. Verification of the DC will be performed by an independent Design Verifier in accordance with Section III of Reference (B). In addition to Verifying that all applicable items listed in Attachment E to Reference (B) have been properly addressed, the Independent Design Verifier will ensure that all reasonably achievable CNS Human Factors Engineering Standards have been incorporated by the DC package.

D. Preliminary review and approval of the conceptual design change will be performed by the DCRDR Team when requested by the Design Engineer. The criteria for approval should be the same as, but a less formal application of, the criteria for Validation.

E. Validation of DC package will be accomplished by the DCRDR Team. The objective of the Validation process is to review the DC package and evaluate the integration of the proposed change into the function of existing system components.

Validation may be accomplished using one of two methods; Control Room Walk-Through or Table-Top Discussion. The criteria for acceptance is:

1. The proposed changes incorporate all reasonably achievable CNS Human Factors Engineering Standards.

2. The proposed changes do not create any new HEDs whose consequences are potentially more detrimental than the original HED.

3. The proposed change is judged an improvement in the operator/machine interface when compared to the existing configuration.

The Team Leader will signify the Team's Validation of the DC by initialling and dating the Operations Manager's signature line on Attachment B to Reference (B).

If the Team cannot Validate the DC, the Team Leader will record the Team's concerns, attach them to the DC package and return it to the Design Engineer for resolution.

If the Design Engineer cannot resolve the Team's comments he may submit the DC package, including comments, to SORC for final disposition.

Following approval by SORC the design change will be forwarded to the CNS Maintenance Planner/Scheduler for implementation.

VI. ATTACHMENTS

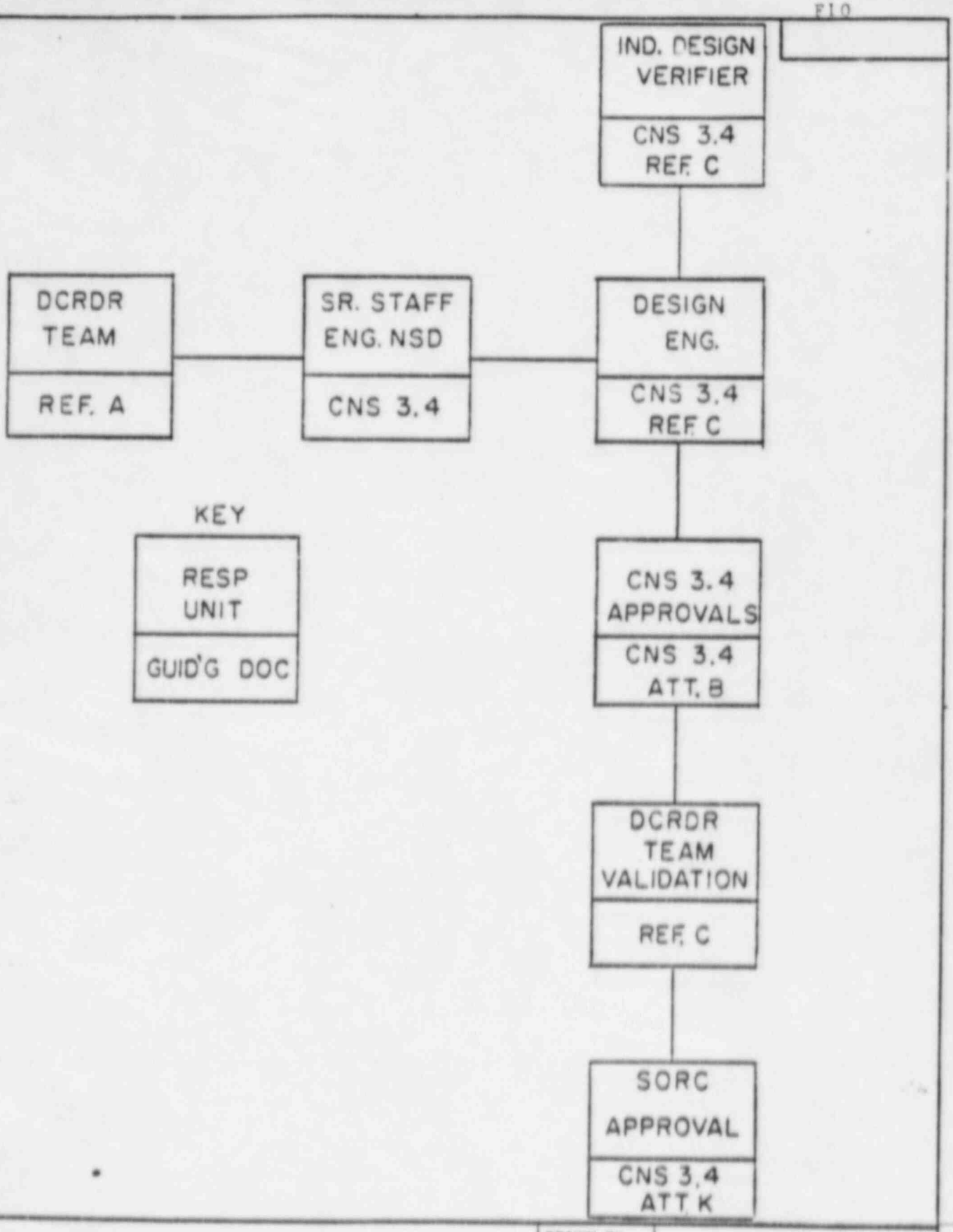
A. DCRDR Program Design Change Flow Chart.

VII. REFERENCES

A. "Cooper Nuclear Station Detailed Control Room Design Review Summary Report", dated February 4, 1985.

B. Cooper Nuclear Station Engineering Procedure 3.4, "Station Design Changes".

C. "Cooper Nuclear Station Control Room Human Factors Engineering Standards and Implementation Guidelines", General Electric Report MDE-142-0685, June 1985.



DCRDR PROGRAM
DESIGN CHANGE
FLOW CHART
(ATTACHMENT A)

REVISIONS	DATE

DRAWN BY

APPROVED BY

SCALE

SIZE A

Nebraska Public Power District

APPENDIX G

DESIGN CHANGE PACKAGE FOR VBD-5

DRAFT

STATION DESIGN CHANGE

TITLE: CRDR VBD-S Modifications

PRELIMINARY

[X] DC Or [ ] ESC NUMBER: 85-15D

DCR NUMBER: _____

DATE: 12-9-85

APPROVALS

CNS ORIGINATOR	G.O. ORIGINATOR
Design Engineer: _____ Date: _____	Design Engineer: M. Pan Date: 2-14-86
	NED Supervisor: _____ Date: _____
	NED Manager: _____ Date: _____

Independent Design Verification: _____ Date: _____

Plant Engineering Supervisor: _____ Date: _____

Operations Engineering Supervisor: _____ Date: _____

Computer Applications Supervisor: _____ Date: _____

Operations Supervisor: _____ Date: _____

Chemistry And Health Physics Supervisor: _____ Date: _____

Maintenance Supervisor: _____ Date: _____

I & C Supervisor: _____ Date: _____

Q.A. Manager: _____ Date: _____

Administrative Services Manager (Security Systems Only): _____ Date: _____

Maintenance Manager: _____ Date: _____

Operations Manager: _____ Date: _____

Technical Manager: _____ Date: _____

Technical Staff Manager: _____ Date: _____

Division Manager Of Nuclear Operations: _____

Date Of Final Approval: _____

SRAB REVIEW: Required: [ ] N/A: [ ] Licensing Dept.: _____ Date: _____

1. _____ Date: _____
2. _____ Date: _____
3. _____ Date: _____
4. _____ Date: _____
5. _____ Date: _____
6. _____ Date: _____

SRAB Chairman: _____ Date: _____

PRELIMINARY

DC 85-15D

CRDR VBD-S MODIFICATIONS

I. DESCRIPTION

As a continuation of the Control Room Design Review (CRDR) program to improve station reliability and safety through better man-machine interface, this Design Change will apply Human Factors Engineering (HFE) principles to Cooper Nuclear Station Control Room Panel VBD-S. These principles shall be incorporated through enhancement of control-display relationships, labeling, demarcation, zone marking of displays, and by providing additional parameter information to the operator.

Modifications to panel VBD-S will consist of creating functional groups of related controls and displays. In detail this involves the relocation of the Yard Electric Manhole Sump Pump W and Y control switches and status lights, and the relocation of the Elevated Release Point Sump Pumps Z-1 and Z-2 control switches and status lights along with their respective start counters and run-hour meters.

To provide continuous monitoring of the torus area level, the existing field instruments will be replaced. The present system consists of a bubbler system located in the reactor building torus area with an ON/OFF switch located on control room panel VBD-S. The ON/OFF switch must be placed in the ON position to activate the bubbler system. To leave this switch always in the ON position would cause air always to be blowing into the torus area. While this is not a problem it is not practical. For this reason the existing instruments will be replaced with a more suitable 1E qualified device with the range of monitoring expanded an additional two feet. Indication will be provided on Control Room panel VBD-S and annunciation provided on Control Room Annunciation S-1.

The additional parameter information shall be provided through the installation of new 1E qualified level transmitters in each of the Reactor Building Floor Drain Sumps 1A, 1B, 1C, and 1D with ranges expanded an additional seven feet above the top of the sump to monitor for flooding of each quad. Indication will be provided on Panel VBD-S and PMIS computer.

Enhancement to panel VBD-S shall be provided through labeling, demarcation, and zone-marking of displays. Labeling shall be of a heirarchical scheme depicting (1) major systems, (2) subsystems and functiona groups, and (3) component labels identifying each discrete panel element. Lines of demarcation will be used to enclose functionally related controls, and related controls and displays. See NPPD drawing SKE-EE-62 for a pictoral layout of panel VBD-S after modification. Zone marking of displays will identify normal operating ranges, and upper and lower limits by color coding the display scales accordingly.

Amd (NUDC 11)

PRELIMINARY

II. JUSTIFICATION

Due to the NRC Action Plan Developed as a Result of the TMI-2 Accident (NUREG 0660), Nebraska Public Power District is required to perform a Detailed Control Room Design Review (NUREG 0700) of various station conditions which affect operator performance and implement a plan which will correct deficiencies identified. This Design Change shall fulfill these obligations for Control Room Panel VBD-S.

III. ANALYSIS

A. SAFETY ANALYSIS

The implementation of this Design Change will not degrade the safety of Cooper Nuclear Station with respect to personnel, equipment, or nuclear safety. Rather it is the intent to upgrade station safety by reducing operator decision making and opportunity for error.

This Design Change will be implemented with the majority of equipment operated from Panel VBD-S remaining in service. The exceptions are the Yard Electric Manhole Sump Pumps 1WA and 1YA, and the Elevated Release Point Sump Pumps 1Z-1 and 1Z-2. These pumps will be de-energized during the period when their respective controls are relocated on the panel. These pumps affect systems outside the Reactor Building so nuclear safety should not be affected. The torus area level transmitter will also be removed from service during the period when the transmitter is replaced. However, a small rupture of the torus would be detected during normal operator walkdown and a large rupture would be detected by the four level transmitters on the torus.

B. DESIGN ANALYSIS

The installation of new instrumentation will meet or exceed Category 2 criteria of Regulatory Guide 1.97. Only highly reliable power sources will be utilized. Division separation will be in compliance with IEEE 384-1981 (Independence of Class 1E Equipment and Circuits) paragraph 6.6.2 and NRC Regulatory Guide 1.75 (Physical Independence of Electric Systems) paragraph 5.6.2. Existing spare cable circuits will be used between each of the four quads to the Cable Spreading Room. Additional cable in the spreading room will be required to complete the design with routing through appropriate division cable trays. The trays utilized have been visually inspected and verified space available.

SORC review and approval of this Design Change indicates that the individual members of SORC concur that this Design Change does not present a safety problem nor create an unreviewed safety question based on a review of the 10CFR50.59 analysis. Approvals further indicate that the responsible department heads acknowledge, accept, and will implement the associated activities within their areas of responsibility as delineated in approval procedures, policy, statements, and position description.

PRELIMINARY

IV. FIRE HAZARD ANALYSIS

A. FIRE POTENTIAL

The potential for fire will exist during various phases of implementation of this Design Change. Cutting and welding will be required on Panel VBD-S in the Control Room to facilitate the repair of the panel due to relocation of controls. Additional welding will be required in each of the four quads during installation of the new instrumentation. Once construction has been completed no additional fire hazards will be introduced.

B. PRECAUTIONS

Several methods of reducing fire potential will be utilized in the Control Room. Fire retardant blankets will be draped in and around Panel VBD-S while welding is in progress. A portable pressurized CO_2 fire extinguisher shall be easily accessible at this time. These methods plus the existing fire protection system and the fact the Control Room always having operating personnel in the vicinity should adequately protect against fire.

Protective measures during welding phases in each of the quads will consist of the removal or covering of combustible material in the area and the availability of the pressurized water portable fire extinguisher.

C. EFFECT OF A FIRE

A fire in Control Room Panel VBD-S could render the sump pump systems inoperable. This is undesirable, but not extremely detrimental to reactor operation and safety. Due to the Control Room being the nerve center of the station, a large fire in the Control Room could have severe consequences. Normal operating and ECCS systems could be rendered in-operable. However, it should be noted that the welding which will be required is minor in size and nature.

A fire in each of the quads could also jeopardize reactor safety. Specifically a fire in the NE quad could render the sump system, RCIC system, and A Core Spray system inoperable. A fire in the NW quad could affect the sump system, A RHR system, and Reactor Recirc. instrumentation. Systems in the SE quad include B Core Spray and Reactor building sumps. The SW quad houses the B RHR system and sump system. In addition to protective measures outlined in the PRECAUTION section of this Design Change a fire watch will be maintained in each of the quads after welding has been completed.

D. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES

Not applicable.

V. REFERENCES

CNS Control Room Human Factors Engineering Standards & Implementation Guidelines
NUREG 0660 - NRC Action Plan Developed as a result of TMI-2 Accident
NUREG 0700 - Detailed Control Room Design Review
NRC Regulatory Guide 1.75
NRC Regulatory Guide 1.97
IEEE 323-1983 - Qualifying Class 1E Equipment
IEEE 344-1975 - Seismic Qualification of 1E Equipment
IEEE 384-1981 - Independence of Class 1E Equipment and Circuits
B&R Dwg. M-106, Rev.3 - VBD-S and VBD-J Layout
B&R Dwg. 3255, Sheet 55, Rev. 4 - VBD-S Connection Diagram
B&R Dwg. 3255, Sheet 79, Rev. 1 - VBD-S Connection Diagram
B&R Dwg. 3257, Sheet 1, Rev. 9 - Local Rack Connection Diagram
B&R Dwg. 3257, Sheet 2, Rev. 4 - Local Rack Connection Diagram
B&R Dwg. 3006, Sheet 5, Rev. 18 - Aux. One Line Diagram
B&R Dwg. 3007, Sheet 6, Rev. 13 - Aux. One Line Diagram
B&R Dwg. 3040, Sheet 9, Rev. 6 - Control Elementary Diagram
B&R Dwg. 3069, Sheet 21, Rev. 13 - Control Elementary Diagram
B&R Dwg. 2059, Rev. 3 - Reactor Building General Arrangement
B&R Dwg. 4203, Rev. 9 - Reactor Building Foundation Plan
B&R Dwg. 4204, Rev. 7 - Reactor Building Foundation Plan
B&R Dwg. 3254, Sheet 12, Rev. 1 - Connection Diagram RTD Cab. B
B&R Dwg. 3254, Sheet 13, Rev. 3 - Connection Diagram RTD Cab. B
B&R Dwg. 3257, Sheet 52, Rev. 2 - Connection Diagram Cab. PL1
B&R Dwg. E507, Sheet 74, Rev. 2 - Connection Diagram Terminal Boxes
B&R Dwg. ID-124, Sheet 138, Rev. 4 - Water Level Instrumentation
B&R Dwg. 3212, Rev. 13 - Cable Tray and Conduit Plan
B&R Dwg. 3214, Sheet 1, Rev. 10 - Cable Tray Loading Schedule
B&R Dwg. 3214, Sheet 2, Rev. 11 - Cable Tray Loading Schedule
B&R Dwg. 3214, Sheet 3, Rev. 4 - Cable Tray Loading Schedule
B&R Dwg. 3214, Sheet 4, Rev. 1 - Cable Tray Loading Schedule
Honeywell Dwg. 1550-14, Rev. 13 - Steel Fabrication Details
Honeywell Dwg 1550-204, Rev. 1 - VBD-S Connection Diagram
Rosemount Product Data Sheet 2504
Rosemount Product Data Sheet 2498
Rosemount Instruction Manual 4302, Rev. C

VI. PRECAUTIONS

A. Caution should be exercised during electrical circuit terminations as several circuits will be energized. These circuits will be identified at the appropriate step of the installation procedure.

B. Exercise caution when drilling, cutting, and welding in Panel VBD-S not to damage existing cabinet wiring or components.

C. When painting Panel VBD-S care should be taken to prevent overspray of panel components.

D. The Reactor Building sumps should be considered a high radiation area. Consult the Health/Physics Department for proper protection.

VII. INSTALLATION PROCEDURES

This installation procedure will be broken down into six sections. Section A will be modifications and enhancements to Panel VBD-S. Section B will be installation of instrumentation on Sump 1A and NW Quad. Section C will be installation of instrumentation on Sump 1B and NE Quad. Section D will be installation of instrumentation on Sump 1C and SW Quad. Section E will be installation of instrumentation on Sump 1D and SE Quad. Section F will be torus area level instrumentation installation.

Note: For any new cabinet wire installed or existing wire replaced use No. 12 stranded Firewall SIS EQ switchboard wire, CNS No. 16162.

Section A

Note: Section A of this Design Change should be implemented with the reactor in cold shutdown.

A1. De-energize and tag open the Yard Electric Manhole Sump Pump 1WA by opening breaker 3E at MCC-L. This will also remove power from the selector switch and indicating lights on VBD-S. Reference B&R Drawing 3006.

_____ _____ / _____

Clearance Order No. Operator Sign-Off Date

A2. De-energize and tag open the Yard Electric Manhole Sump Pump 1YA by opening breaker 1F at MCC-T. This will also remove power from the selector switch and indicating lights on VBD-S. Reference B&R Drawing 3006.

_____ _____ / _____

Clearance Order No. Operator Sign-Off Date

A3. De-energize and tag open the Elevated Release Point Sump Pump 1Z-1 by opening the breaker at starter Panel PPGB-1 in the Off Gas Building. This will also remove power from the selector switch and indicating lights on VBD-S. Reference B&R Drawing 3196, Sheet 1.

_____ _____ / _____

Clearance Order No. Operator Sign-Off Date

A4. De-energize and tag open the Elevated Release Point Sump Pump 1Z-2 by opening the breaker at starter Panel PPGB-1 in the Off Gas Building. This will also remove power from the selector switch and indicating lights on VBD-S. Reference B&R Drawing 3196, Sheet 1.

_____ _____ / _____

Clearance Order No. Operator Sign-Off Date

A5. Lift cabinet wires on TB6, Terminals 418, 420, 429, and 431, in Panel VBD-S. These are the internal cabinet wires for Items 52, 53, 54, and 55 shown on NPPD Drawing SKE-EE-61. Ensure each wire is identified so they can be reterminated later in this procedure

_____ / _____
Electrical Sign-Off Date

A6. Remove Items 52, 53, 54, 55, and transformer assembly in rear from VBD-S shown on NPPD Drawing SKE-EE-61. Tag and retain devices and mounting hardware as they will be re-installed later at new locations.

_____ / _____
Electrical Sign-Off Date

A7. Lift Manhole Sump W (Item 38) cabinet wires on TB5, Terminals 396 through 406 in Panel VBD-S. Ensure each wire is identified so they can be reterminated later in this procedure. Reference Honeywell Drawing 1550-204.

_____ / _____
Electrical Sign-Off Date

A8. Remove Item 38 and associated indicating lights from VBD-S as shown on NPPD Drawing SKE-EE-61. Tag and retain devices and mounting hardware as they will be reinstalled later in this procedure at a new location.

_____ / _____
Electrical Sign-Off Date

A9. Lift Manhole Sump Y (Item 39) cabinet wires on TB5, Terminals 407 through 417 in Panel VBD-S. Ensure each wire is identified so they can be reterminated later in this procedure. Reference Honeywell Drawing 1550-204.

_____ / _____
Electrical Sign-Off Date

A10. Remove Item 39 and associated indicating lights from VBD-S as shown on NPPD Drawing SKE-EE-61. Tag and retain devices and mounting hardware as they will be reinstalled later in this procedure at a new location.

_____ / _____
Electrical Sign-Off Date

A11. Lift ERP Sump 1Z-1 (Item 44) cabinet wires on TB5, Terminals 418 through 428 in Panel VBD-S. Ensure each wire is identified so they can be reterminated later in this procedure. Reference Honeywell Drawing 1550-204.

_____ / _____
Electrical Sign-Off Date

A12. Remove Item 44 and associated indicating lights from VBD-S as shown on NPPD Drawing SKE-EE-61. Tag and retain devices and mounting hardware as they will be reinstalled later in this procedure at a new location.

_____ / _____
Electrical Sign-Off Date

A13. Lift ERP Sump 1Z-2 (Item 45) cabinet wires on TB5, Terminals 429 through 439 in Panel VBD-S. Ensure each wire is identified so they can be reterminated later in this procedure. Reference Honeywell Drawing 1550-204.

_____ / _____
Electrical Sign-Off Date

A14. Remove Item 45 and associated indicating lights from VBD-S as shown on NPPD Drawing SKE-EE-61. Tag and retain devices and mounting hardware as they will be reinstalled later in this procedure at a new location.

_____ / _____
Electrical Sign-Off Date

A15. Remove AC Fuse PS-12 in Panel VBD-S as shown on Honeywell Drawing 1550-204. This will remove the torus area level transmitter from service. Inform shift supervisor.

_____ / _____
Electrical Sign-Off Date

A16. Remove DC Fuse LI-900 in Panel VBD-S as shown on Honeywell Drawing 1550-204.

_____ / _____
Electrical Sign-Off Date

A17. Remove cabinet wire jumper from TB6, Terminal 531 to TB7, Terminal 548 in Panel VBD-S. Exercise caution when removing this jumper as Terminal 531 is energized with 120VAC. Reference B&R Drawing 3255, Sheet 79.

_____ / _____
Electrical Sign-Off Date

A18. Remove cabinet wire jumper from TB6, Terminal 536 to TB7, Terminal 547 in Panel VBD-S. Exercise caution when removing this jumper as Terminal 536 is energized with 120VAC. Reference B&R Drawing 3255, Sheet 79.

_____ / _____
Electrical Sign-Off Date

A19. Lift and spare out Cable M747 at TB7, Terminals 545, 546, and 547. Reference B&R Drawing 3255, Sheet 79.

_____ /_____
Electrical Sign-Off Date

A20. Lift cabinet wires on TB7, Terminals 545 and 546 in Panel VBD-S. Reference B&R Drawing 3255, Sheet 79.

_____ /_____
Electrical Sign-Off Date

A21. Remove Item 56 (Torus Area ON/OFF Switch) from Panel VBD-S. Reference NPPD Drawing SKE-EE-61.

_____ /_____
Electrical Sign-Off Date

A22. Remove cabinet wire from TB7, Terminal 550 to AC Fuse Holder PS-12 in Panel VBD-S. Reference Honeywell Drawing 1550-204.

_____ /_____
Electrical Sign-Off Date

A23. Remove cabinet wire from AC Fuse Holder PS-12 to the High AC input terminal of Power Supply RW-ES-12 in Panel VBD-S. Reference Honeywell Drawing 1550-204.

_____ /_____
Electrical Sign-Off Date

A24. Remove cabinet wire from TB7, Terminal 551 in the neutral AC input terminal of Power Supply RW-ES-12 in Panel VBD-S. Reference Drawing 1550-204.

_____ /_____
Electrical Sign-Off Date

A25. Remove cabinet wire from the positive output terminal of Power Supply RW-ES-12 to DC Fuse Holder L1-900 in Panel VBD-S. Reference Drawing 1550-204.

_____ /_____
Electrical Sign-Off Date

A26. Remove Cabinet wire from DC Fuse Holder L1-900 to the positive terminal of Level Indicator RW-L1-900 in Panel VBD-S. Reference Drawing 1550-204.

_____ /_____
Electrical Sign-Off Date

A27. Remove cabinet wire from the negative terminal of Level Indicator RW-LI-900 to TB7, Terminal 541 in Panel VBD-S. Reference Drawing 1550-204.

_____ / _____
Electrical Sign-Off Date

A28. Remove Power Supply RW-ES-12 from Panel VBD-S. Tag device and return to spare parts.

_____ / _____
Electrical Sign-Off Date

A29. Prepare to cut holes in Panel VBD-S as shown on NPPD Drawing SKE-EE-63, Detail "B". Preparations consist of draping plastic over surrounding controls beside and below where cutting is to take place. This is to prevent iron filings from damaging other electrical components in the panel.

_____ / _____
Electrical Sign-Off Date

A30. Cut holes in Panel VBD-S as shown on NPPD Drawing SKE-EE-63, Detail "B". Exercise caution not to damage existing cabinet wires.

_____ / _____
Electrical Sign-Off Date

A31. Prepare to cut holes in Panel VBD-S as shown on NPPD Drawing SKE-EE-63, Detail "C" Preparations consist of draping plastic over surrounding controls beside and below where cutting is to take place. This is to prevent iron filings from damaging other electrical components in the panel.

_____ / _____
Electrical Sign-Off Date

A32. Cut holes in Panel VBD-S as shown on NPPD Drawing SKE-EE-63, Detail "C". Exercise caution not to damage existing cabinet wires.

_____ / _____
Electrical Sign-Off Date

A33. Prepare to cut holes in Panel VBD-S as shown on NPPD Drawing SKE-EE-63, Detail "A". Preparations consist of draping plastic over surrounding controls beside and below where cutting is to take place. This is to prevent iron filings from damaging other electrical components in the panel.

_____ / _____
Electrical Sign-Off Date

A34. Cut holes in Panel VBD-S as shown on NPPD Drawing SKE-EE-63, Detail "A". Exercise caution not to damage existing cabinet wires.

_____ /_____
Electrical Sign-Off Date

A35. Remove the blank covers located right of Selector Switch 39 shown on NPPD Drawing SKE-EE-63.

_____ /_____
Electrical Sign-Off Date

A36. Prepare to patch holes in Panel VBD-S vacated due to the removal and relocation of controls. Due to welding being required, preparation should consist of removal of flammable material from the area, a CO_2 fire extinguisher readily available, and drape fire retardant blankets around and below the panel.

_____ /_____
Maintenance Sign-Off Date

A37. Repair hole at location of Component 56 shown on NPPD Drawing SKE-EE-63. Repair by cutting a piece of plate A36 grade and 3/16" thickness to the shape as hole being repaired. Flush weld the piece using oxy-acetylene weld on both sides of panel and grind to smooth finish. Reference Weld Procedure M.P.7.7 P1-K. Plate received under PO 251950.

_____ /_____
Maintenance Sign-Off Date

A38. Repair holes at location of Components 52, 53, 54, and 55 shown on NPPD Drawing SKE-EE-63. Repair as outlined in Step A37.

_____ /_____
Maintenance Sign-Off Date

A39. Repair holes at location of Components 54 and 55 shown on NPPD Drawing SKE-EE-63. Repair as outlined in Step A38.

_____ /_____
Maintenance Sign-Off Date

A40. Remove all existing plastic labels from Panel VBD-S. New labels will be reinstalled later in this procedure.

_____ /_____
Operator Sign-Off Date

A41. Prepare to paint Panel VBD-S by masking of all components on the panel. Ensure no overspray of adjoining panels. Also mask all cut outs from the rear to prevent paint spray in the back of the panel.

_____ / _____
Painter Sign-Off Date

A42. Paint Panel VBD-S as directed by Operations Department.

_____ / _____
Painter Sign-Off Date

A43. Install Level Indicators RW-LI-828, 829, 830, and 831 in the position shown on NPPD Drawing SKE-EE-62. Indicators are purchased under PO 250776. See installation instructions provided with the indicators.

_____ / _____
Electrical Sign-Off Date

A44. Mount the transformer assembly removed in Step A6 in the position shown on NPPD Drawing SKE-EE-64.

_____ / _____
Electrical Sign-Off Date

A45. Mount and terminate Items 52, 53, 54, and 55 in the position shown on NPPD Drawing SKE-EE-62. Reference B&R Drawing 3255, Sheet 79, for electrical termination.

_____ / _____
Electrical Sign-Off Date

A46. Install Fuse Holders 829A, 829, 12, 828, 830, 831, and 900 in the position shown on NPPD Drawing SKE-EE-64.

_____ / _____
Electrical Sign-Off Date

A47. Install Power Supplies RW-ES-12, RW-ES-829 and Alarm Module RW-AM-900 in the position shown on NPPD Drawing SKE-EE-64. Power supplies received under PO _____. Alarm Module received under PO _____.

_____ / _____
Electrical Sign-Off Date

A48. Install and terminate Yard Electric Manhole Sump Pump Y control switch and lights (Item 39) in the position shown on NPPD Drawing SKE-EE-62. Reference B&R Drawing 3255, Sheet 79, and Honeywell Drawing 1550-204 for electrical terminations.

_____ / _____
Electrical Sign-Off Date

A49. Install and terminate Yard Electric Manhole Sump Pump W control switch and lights (Item 38) in the position shown on NPPD Drawing SKE-EE-62. Reference B&R Drawing 3255, Sheet 79, and Honeywell Drawing 1550-204 for electrical terminations.

_____ /_____
Electrical Sign-Off Date

A50. Install and terminate ERP Sump Pump Z-1 control switch and lights (Item 44) in the position shown on NPPD Drawing SKE-EE-62. Reference B&R Drawing 3255, Sheet 79, and Honeywell Drawing 1550-204 for electrical terminations.

_____ /_____
Electrical Sign-Off Date

A51. Install and terminate ERP Sump Pump Z-2 control switch and lights (Item 45) in the position shown on NPPD Drawing SKE-EE-62. Reference B&R Drawing 3255, Sheet 79, and Honeywell Drawing 1550-204 for electrical terminations.

_____ /_____
Electrical Sign-Off Date

A52. Pull and terminate Cables IT339 and IT341 (both 3TP No. 16SH) from RTD CAB "B" to Panel VBD-S. Route cable through Section 205, Tray C214; Section 206, Tray C214; Section 207, Tray C217; Section 209, Tray C217; Section 211, Tray C217; and Section 212, Tray C216. Enter Panel VBD-S through the Division II riser. See NPPD Drawing SKE-EE-66 for electrical terminations. Cable is tagged and stored at Warehouse Location WH-3-12-M.

_____ /_____
Electrical Sign-Off Date

A53. Pull and terminate Cable IT 340, 3TP No. 16SH from Forboro CAB PL1 to Panel VBD-S. Route cable through Trays C205, Section 215; C205, Section 210; C203, Section 211; and C202, Section 212. Enter Panel VBD-S through Division I riser. See NPPD Drawing SKE-EE-66 for electrical terminations. Cable is tagged and stored at Warehouse Location WH-3-12-M.

_____ /_____
Electrical Sign-Off Date

A54. Terminate Cables C777 and C778 from PMIS in Panel VBD-S as shown on NPPD Drawing SKE-EE-66.

_____ /_____
Electrical Sign-Off Date

A55. Install cabinet wires for indicators RW-LI-828, 829, 830, 831, 900, Power Supplies RW-ES-12 and 829, and Fuses 828, 829, 830, 831, and 900, and Alarm Module RW-AM-900 as shown on NPPD Drawing SKE-EE-66.

_____ /_____
Electrical Sign-Off Date

A56. Install a cabinet wire from TB7, Terminal 550 to one side of Fuse Holder 829A. Exercise caution as Terminal 550 is energized with 120VAC.

_____ /_____
Electrical Sign-Off Date

A57. Install a cabinet wire from the other side of Fuse Holder 829A to the AC High input of Power Supply RW-ES-829.

_____ /_____
Electrical Sign-Off Date

A58. Install a cabinet wire from TB7, Terminal 551 to the AC LO input of Power Supply RW-ES-829. Exercise caution as Terminal 551 is energized with 120VAC.

_____ /_____
Electrical Sign-Off Date

A59. Pull and terminate a 3C#12 cable from Control Room Panel VBD-J to Panel VBD-S. Connect VBD-J Terminal 218 to VBD-S Terminal 573. Connect VBD-J Terminal 219 to VBD-S Terminal 574. Cable has been requisitioned from Cable Contract 84-050 and is stored at Warehouse Location WH-3-12-M. Exercise caution as terminals in VBD-J are energized with 120VAC.

_____ /_____
Electrical Sign-Off Date

A60. Install cabinet wire in Panel VBD-S from Terminal 573 to one side of AC Fuse Holder 12. Exercise caution as Terminal 573 is energized with 120VAC.

_____ /_____
Electrical Sign-Off Date

A61. Install cabinet wire in Panel VBD-S from Terminal 574 to the LO input terminal of Power Supply RW-ES-12. Exercise caution as Terminal 574 is energized with 120VAC.

_____ /_____
Electrical Sign-Off Date

A62. Insert AC Fuse Block Fuses 12 and 829A. Fuses to be rated 1A. Tune Power Supplies RW-ES-12 and RW-ES-829 for 25VDC ± 5VDC. Do not insert DC fuses at this time.

I&C Sign-Off _____ / _____ Date

A63. Inform the shift supervisor the Augmented Radwaste HVAC Trouble Alarm will be temporarily disabled. This alarm is being moved to the Panel R annunicators. The window on Annunciator S-1 will now be the TORUS AREA HIGH LEVEL alarm.

Shift Supervisor Sign-Off _____ / _____ Date

A64. Lift Cable A562 from Annunciator S-1. Pull back and terminate on TB7 Terminals 574 and 575 in Panel VBD-S as shown on NPPD Drawing SKE-EE-66.

Electrical Sign-Off _____ / _____ Date

A65. Install cabinet wires from Alarm Module RW-AM-900, Terminals 5 and 7, to Annunciator S-1, Window 6-2, as shown on NPPD Drawing SKE-EE-66.

Electrical Sign-Off _____ / _____ Date

A66. Remove existing Window 6-2 ARW-HVAC TROUBLE from Annunciator S-1 and install in Annunciator R-1, Window 4-4. Install new Window 6-2 TORUS AREA HIGH LEVEL in Annunciator S-1.

Electrical Sign-Off _____ / _____ Date

A67. Pull and terminate Cable A596, 3C No. 12, from Panel VBD-S to Panel VBD-R, Annunciator R-1, Window 4-4. Cable has been requisitioned from Contract 84-050 and is stored at warehouse location WH-3-12-M. See NPPD Drawing SKE-EE-66 for electrical terminations.

Electrical Sign-Off _____ / _____ Date

A68. Install new labels on Panel VBD-S as shown on NPPD Drawing SKE-EE-62.

Operator Sign-Off _____ / _____ Date

A69. Apply demarcation lines to Panel VBD-S as shown on NPPD Drawing SKE-EE-62. Enhancement material has been purchased under PO 245946 and _____.

_____ / _____
Operator Sign-Off Date

A70. Replace torus area Level Indicator Scale RW-LI-900. New scale purchased under PO 248379.

_____ / _____
I&C Sign-Off Date

A71. Zone mark displays RW-L1-828, RW-L1-829, RW-L1-830, RW-L1-831, and RW-L1-900 as outlined in the Cooper Nuclear Station Control Room Human Factors Engineering Standards and Implementation Guidelines, Section 4.3, Step 3, page 4-5.

_____ / _____
I&C Sign-Off Date

Section B

Note: Steps B1 through B22 may be performed while the reactor is critical. Steps B23 through B34 should be performed with the reactor in cold shutdown and after Section A of this Design Change has been completed.

B1. Notify the Control Room shift supervisor of installation and request clearance.

_____ / _____
Shift Supervisor Sign-Off Date

B2. Perform bench test calibration of Level Transmitter RW-LT-828 for Sump 1A. Instrumentation received under PO 250615. See NPPD Drawing SKE-EE-75 for calibration data.

_____ / _____
I&C Sign-Off Date

B3. Fabricate four remote diaphram seal mounting brackets as shown on NPPD Drawing SKE-EE-67, Sheet 3.

_____ / _____
Maintenance Sign-Off Date

B4. Fabricate one remote diaphram seal mounting bracket for the torus area level transmitter as shown on NPPD drawing SKE-EE-67, Sheet 3. Due to easier access to the remote seal the 1 1/2 inch galvanized rigid conduit will not need to be as long as the sump units, field fit to desired length not to exceed 84 inches.

_____ / _____
Maintenance Sign-Off Date

B5. Fabricate five transmitter Unistrut mounting plates as shown on NPPD Drawing SKE-EE-76.

_____ / _____
Maintenance Sign-Off Date

B6. Fabricate five Unistrut mounting plates for 6x4x4 Hoffman enclosures as shown on NPPD Drawing SKE-EE-76.

_____ / _____
Maintenance Sign-Off Date

B7. Fabricate ten pieces of essential commercial grade P33 Unistrut as shown on NPPD Drawing SKE-EE-76.

_____ / _____
Electrical Sign-Off Date

B8. Ensure the Mechanical Installation section of Rosemount Instruction Manual 4302, Rev. C, has been read prior to proceeding with the following steps.

_____ / _____
Electrical Sign-Off Date

_____ / _____
I&C Sign-Off Date

B9. Using a 1/2-inch masonry drill bit, drill six holes in the concrete to a depth of 1 3/4" as shown on NPPD Drawing SKE-EE-76. Care must be taken to ensure when drilling that when the transmitter is mounted, the center line of the transmitter is exactly seven feet above the floor. Horizontal positioning is allowed to avoid rebar. The transmitter capillary tubing is 30 ft. in length so the transmitter assembly should be positioned on the wall center of the sump. There is enough slack to allow positioning three feet to the right if required.

_____ / _____
Electrical Sign-Off Date

B10. Insert essential commercial grade 3/8-inch Hilti Drop In Anchors in each hole and attach the Unistrut to the wall. Use 3/8" x 3/4" bolts and washers and torque to 25 ft. lbs.

_____ _____ / _____
Torque Wrench No. Electrical Sign-Off Date

B11. Attach the Rosemount bracket to the mounting plate fabricated in Step B5 as shown in Figure 3 of the Instruction Manual. Use four each 5/16-18 stainless steel bolts and nuts (ASTM A-193, Class 2, Grade B-8). Torque each bolt to 200 in. lbs.

_____ _____ / _____
Torque Wrench No. I&C Sign-Off Date

B12. Bolt new Transmitter RW-LT-828 to mounting bracket as shown on Figure 3 of Instruction Manual. Use four each 7/16-20x3/4 bolts and nuts with washer. Torque to 250 in. lbs.

_____ _____ / _____
Torque Wrench No. I&C Sign-Off Date

B13. Attach transmitter and mounting plate to the Unistrut installed in Step B10. Use essential commercial grade 3/8 x 3/4, ASTM A307 and Unistrut nuts. Torque to 19 ft. lbs.

_____ _____ / _____
Torque Wrench No. I&C Sign-Off Date

B14. Attach 6x4x4 Hoffman enclosure to mounting plate and Unistrut fabricated in Step B6. Use essential commercial grade 1/4 x 3/4 ASTM A307 bolts. Hoffmans purchased under PO 250165.

_____ / _____
Electrical Sign-Off Date

B15. Ensure the Electrical Installation section of Rosemount Instruction Manual 4302, Rev. C, have been read prior to proceeding with the following steps.

_____ / _____
Electrical Sign-Off Date

B16. Two conduit hubs are provided. Choose one based on convenience of tying to Hoffman enclosure and plug the other using 1/2-14NPT stainless steel pipe plug and thread sealant. Torque to 150 in.lbs.

_____ _____ / _____
Torque Wrench No. Electrical Sign-Off Date

B17. Install Rosemount Model 353C nuclear qualified conduit seal using thread sealant on the transmitter side. Torque to 150 in. lbs. The short 12-inch leads are the transmitter side. Seals received under PO 250615.

_____ _____ / _____
Torque Wrench No. Electrical Sign-Off Date

B18. Install oil tight conduit from the transmitter conduit seal to the local Hoffman enclosure.

_____ / _____
Electrical Sign-Off Date

B19. Install 3/4-inch rigid conduit from the local Hoffman enclosure to TB390 at Instrument Rack 25-7. See NPPD Drawing SKE-EE-67, Sheets 1 and 2 for conduit route and hanger locations.

_____ / _____
Electrical Sign-Off Date

B20. Pull and terminate Cable IT342, ITP, No. 16 SH Cable from local Hoffman enclosure to TB390 at Instrument Rack 25-7. Cable has been requisitioned from Cable Contact 84-050 and is stored at warehouse location WH-3-12-M. Raychem splice IT342 to Cable NB4 in TB390 in accordance with CNS Splice Procedure M.P.7.3.26. Raychem splice Cable IT342 to Rosemount conduit seal at local Hoffman enclosure. See NPPD Drawing SKE-EE-66 for terminations.

_____ / _____
Electrical Sign-Off Date

_____ / _____
Q.C. Sign-Off Date

B21. Terminate Cables NB4 and IT339 in RTD CAB "B" as shown on NPPD Drawing SKE-EE-66.

_____ / _____
Electrical Sign-Off Date

B22. Connect Rosemount conduit seal to Transmitter RW-LT-828 as shown on NPPD Drawing SKE-EE-66. Torque each screw to 5 in. lbs. Do not tighten down cover at this time.

_____ _____ / _____
Torque Wrench No. I&C Sign-Off Date

B23. Isolate Sump 1A by closing Valves 770AV-123-F and 767AV-123-F. There will be one 4-inch drain line (1-RW-322-4) that can not be isolated. This line should be stopped with an inflatable rubber plug. Tag valves closed. Reference B&R Drawing 2038.

_____ _____ / _____
Clearance Order No. Operator Sign-Off Date

B24. Manually pump the level of Sump 1A to the lowest level possible without damaging the pump using either sump pump. At this point, use a portable sump pump and remove remaining liquid, storing in drums.

_____ / _____
Maintenance Sign-Off Date

B25. De-energize and tag open the Reactor Building floor drain Sump Pumps 1A-1 and 1A-2 by opening Breaker 1D at MCC-K and Breaker 2C at MCC-R. Reference B&R Drawing 3006, Sheet 5, and Drawing 3007, Sheet 6.

_____ _____ / _____
Clearance Order No. Operator Sign-Off Date

B26. Cut a 8-inch diameter hole through the top of Sump 1A. Due to lack of drawings showing obstructions inside the sump, this hole will be field located once access within the sump is achieved.

_____ / _____
Maintenance Sign-Off Date

B27. Install remote diaphram seal bracket fabricated in Step B3 at Reactor Floor Sump 1A as shown on NPPD Drawing SKE-EE-67, Sheet 3.

_____ / _____
Maintenance Sign-Off Date

B28. Install remote diaphram seal for Transmitter RW-LT-828 in Sump 1A as shown on NPPD Drawing SKE-EE-67, Sheet 3.

_____ / _____
I&C Sign-Off Date

B29. Install DC Fuse FU828 (1/4 Amp) at Control Room Panel VBD-S as shown on NPPD Drawing SKE-EE-64. Loop calibrate level Transmitter RW-LT-828 to level Indicator RW-LI-828 at Panel VBD-S and PMIS Computer Point N340. See NPPD Drawing SKE-EE-75 for calibration data.

_____ / _____
I&C Sign-Off Date

B30. Inspect electrical housing cover and O-ring for cleanliness. If chips and dirt are present, clean per Rosemount Instruction Manual.

_____ / _____
I&C Sign-Off Date

B31. Install electrical housing covers and torque to 200 in. lbs.

_____ _____ / _____
Torque Wrench No. I&C Sign-Off Date

B32. Visual inspection by Engineering.

_____ / _____
Engineer Sign-Off Date

B33. Notify the Control Room of completion of installation and that Transmitter RW-LT-828 and Indicator RW-LI-828 are ready for service. In addition, remove inflatable rubber plugs installed in Step B23, remove tagging orders placed in Step B23, and return Sump Pumps 1-A1 and 1-A2 to service.

_____ / _____
Operator Sign-Off Date

B34. Drain drums of water removed in Step B24 back into the Reactor Building floor drain Sump 1A. Dispose of drums in accordance with radiation protection procedures.

_____ /_____
Maintenance Sign-Off Date

Section C

Note: Steps C1 through C18 may be performed while the reactor is critical. Steps C19 through C30 should be performed with the reactor in cold shutdown and after Section A of this Design Change has been completed.

C1. Notify Control Room shift supervisor of installation and request clearance.

_____ /_____
Shift Supervisor Sign-Off Date

C2. Perform bench test calibration of Level Transmitter RW-LT-829 for Sump 1B. Instrumentation received under PO 250615. See NPPD Drawing SKE-EE-75 for calibration data.

_____ /_____
I&C Sign Off Date

C3. Ensure the Mechanical Installation section of Rosemount Instruction Manual 4302, Rev. C, has been read prior to proceeding with the following steps.

_____ /_____
Electrical Sign-Off Date

_____ /_____
I&C Sign-Off Date

C4. Using a 1/2-inch masonry drill bit, drill six holes in the concrete to a depth of 1 3/4" as shown on NPPD Drawing SKE-EE-76. Care must be taken to ensure when drilling that when the transmitter is mounted, the center line of the transmitter is exactly seven feet above the floor. Horizontal positioning is allowed to avoid rebar. The transmitter capillary tubing is 30 ft. long so the transmitter assembly should be positioned on the wall, center of the sump. There is enough slack to allow positioning three feet to the right if required.

_____ /_____
Electrical Sign-Off Date

C5. Insert essential commercial grade 3/8-inch Hilti Drop In Anchors in each hole and attach the Unistrut cut in B7. Use 3/8" x 3/4" essential commercial grade bolts and washers. Torque to 25 ft. lbs.

Torque Wrench No. _____ Electrical Sign-Off _____ / Date

C6. Attach the Rosemount bracket to the mounting plate fabricated in Step B5 as shown in Figure 3 of the Instruction Manual. Use four each 5/16-18 stainless steel bolts and nuts (ASTM A-193, Class 2, Grade B-8). Torque each bolt to 200 in. lbs.

Torque Wrench No. _____ I&C Sign-Off _____ / Date

C7. Bolt new Transmitter RW-LT-829 to mounting bracket as shown on Figure 3 of Instruction Manual. Use four each 7/16-20x3/4 bolts with washer. Torque to 250 in. lbs.

Torque Wrench No. _____ I&C Sign-Off _____ / Date

C8. Attach transmitter and mounting plate to the Unistrut installed in Step C5. Use essential commercial grade 3/8 x 3/4, ASTM A307 bolts and Unistrut nuts. Torque to 19 ft. lbs.

Torque Wrench No. _____ I&C Sign-Off _____ / Date

C9. Attach 6x4x4 Hoffman enclosure to mounting plate and Unistrut. Plate fabricated in Step B6. Use essential commercial grade 1/4 x 3/4 ASTM A307 bolts. Hoffmans purchased under PO 250165.

Electrical Sign-Off _____ / Date

C10. Ensure the Electrical Installation section of Rosemount Instruction Manual 4302, Rev. C, have been read prior to proceeding with the following steps.

Electrical Sign-Off _____ / Date

I&C Sign-Off _____ / Date

C11. Two conduit hubs are provided. Choose one based on convenience of tying to Hoffman enclosure and plug the other using 1/2-14NPT stainless steel pipe plug and thread sealant. Torque to 150 in.lbs.

Torque Wrench No. _____ Electrical Sign-Off _____ / Date

C12. Install Rosemount Model 353C nuclear qualified conduit seal using thread sealant on the transmitter side. Torque to 150 in. lbs. The short 12-inch leads are the transmitter side. Seals are received under PO 250615.

_____ _____ / _____
Torque Wrench No. Electrical Sign-Off Date

C13. Install oil tight conduit from the transmitter conduit seal to the local Hoffman enclosure installed in Step C9.

_____ / _____
Electrical Sign-Off Date

C14. Install 3/4-inch rigid conduit from the local Hoffman enclosure to TB297 at Instrument Rack 25-1. See NPPD Drawing SKE-EE-67, Sheets 1 and 2 for conduit route and hanger locations.

_____ / _____
Electrical Sign-Off Date

C15. Pull and terminate Cable IT343, ITP, No. 16 SH from local Hoffman enclosure to TB297 at Instrument Rack 25-1. Cable has been requisitioned from Cable Contact 84-050 and is stored at warehouse location WH-3-12-M. Raychem splice IT343 to Cable IT322 in TB390 in accordance with CNS Splice Procedure M.P.7.3.26. Raychem splice Cable IT343 to Rosemount conduit seal at local Hoffman enclosure. See NPPD Drawing SKE-EE-66 for terminations.

_____ / _____
Electrical Sign-Off Date

_____ / _____
Q.C. Sign-Off Date

C16. Raychem splice Cables IT322 and IT321 at terminal box located near MCC-K in accordance with CNS Splice Procedure M.P.7.3.26. See NPPD Drawing SKE-EE-66 for termination.

_____ / _____
Electrical Sign-Off Date

_____ / _____
Q.C. Sign-Off Date

C17. Terminate Cables IT321 and IT340 at Foxboro Cabinet PL1 as shown on NPPD Drawing SKE-EE-66.

_____ / _____
Electrical Sign-Off Date

C18. Connect Rosemount conduit seal to Transmitter RW-LT-829 as shown on NPPD Drawing SKE-EE-66. Torque each screw to 5 in. lbs. Do not tighten down cover at this time.

Torque Wrench No. _____ I&C Sign-Off _____ / Date

C19. Isolate Sump 1B by closing Valve 768AV-123-F. Tag the valve closed. There are two 4-inch lines which can not be isolated located at the bottom of the sump. These lines should be stopped with inflatable rubber plugs. Reference B&R Drawing 2038.

Clearance Order No. _____ Operator Sign-Off _____ / Date

C20. Manually pump the level of Sump 1B to the lowest level possible without damaging the pump using either sump pump. At this point, use a portable sump pump to remove the remaining liquid and store in drums.

Maintenance Sign-Off _____ / Date

C21. De-energize and tag open the Reactor Building floor drain Sump Pumps 1B-1 and 1B-2 by opening Breaker 1E at MCC-K and Breaker 2D at MCC-R. Reference B&R Drawing 3006; Sheet 5, and Drawing 3007, Sheet 6.

Clearance Order No. _____ Operator Sign-Off _____ / Date

C22. Cut a 8-inch diameter hole through the top of Sump 1B. Due to lack of drawings showing obstructions within the sump, this hole will be field located once access to the sump is achieved.

Maintenance Sign-Off _____ / Date

C23. Install remote diaphram seal bracket fabricated in Step B3 at Reactor Sump 1B as shown on NPPD Drawing SKE-EE-67, Sheet 3.

Maintenance Sign-Off _____ / Date

C24. Install remote diaphram seal for Transmitter RW-LT-829 in Sump 1B as shown on NPPD Drawing SKE-EE-67, Sheet 3.

I&C Sign-Off _____ / Date

C25. Install DC Fuse FU829 (1/4 Amp) at Control Room Panel VBD-S as shown on NPPD Drawing SKE-EE-64. Loop calibrate level Transmitter RW-LT-829 to level Indicator RW-LI-829 at Panel VBD-S and PMIS Computer Point N339. See NPPD Drawing SKE-EE-75 for calibration data.

I&C Sign-Off / Date

C26. Inspect electrical housing cover and O-ring for cleanliness. If chips and dirt are present, clean per Rosemount Instruction Manual.

I&C Sign-Off / Date

C27. Install electrical housing covers and torque to 200 in. lbs.

Torque Wrench No. I&C Sign-Off / Date

C28. Visual inspection by Engineering.

Engineer Sign-Off / Date

C29. Notify the Control Room of completion of installation and that Transmitter RW-LT-829 and Indicator RW-LI-829 are ready for service. In addition, remove inflatable rubber plugs installed in Step C19, remove tagging orders placed in Step C19, and return Sump Pumps 1-B1 and 1-B2 to service.

Operator Sign-Off / Date

C30. Drain drums of water removed in Step C20 back into the Reactor Building floor drain Sump 1B. Dispose of drums in accordance with radiation protection procedures.

Maintenance Sign-Off / Date

Section D

Note: Steps D1 through D17 may be performed while the reactor is critical. Steps D18 through D29 should be performed with the reactor in cold shutdown and after Section A of this Design Change has been completed.

D1. Notify the Control Room shift supervisor of installation and request clearance.

Shift Supervisor Sign-Off / Date

D2. Perform bench test calibration of Level Transmitter RW-LT-830 for Sump 1C. Instrumentation has been received under PO 250615. See NPPD Drawing SKE-EE-75 for calibration data.

_____ /_____
I&C Sign Off Date

D3. Ensure the Mechanical Installation section of the Rosemount Instruction Manual 4302, Rev. C, has been read prior to proceeding with the following steps.

_____ /_____
Electrical Sign-Off Date

_____ /_____
I&C Sign-Off Date

D4. Using a 1/2-inch masonry drill bit, drill six holes in the concrete to a depth of 1 3/4" as shown on NPPD Drawing SKE-EE-76. Care must be taken to ensure when drilling that when the transmitter is mounted, the center line of the transmitter is exactly seven feet above the floor. Horizontal positioning is allowed to avoid rebar. The transmitter capillary tubing is 30 ft. in length so the transmitter assembly should be positioned on the wall, center of the sump.

_____ /_____
Electrical Sign-Off Date

D5. Insert essential commercial grade 3/8-inch Hilti Drop In Anchors in each hole and attach the Unistrut cut in B7. se 3/8" x 3/4" essential commercial grade bolts and washers. Torque to 25 ft. lbs.

_____ _____ /_____
Torque Wrench No. Electrical Sign-Off Date

D6. Attach the Rosemount bracket to the mounting plate fabricated in Step B5 as shown in Figure 3 of the Rosemount Instruction Manual. Use four each 5/16-18 stainless steel bolts and nuts (ASTM A-193, Class 2, Grade B-8). Torque each bolt to 200 in. lbs.

_____ _____ /_____
Torque Wrench No. I&C Sign-Off Date

D7. Bolt new Transmitter RW-LT-830 to mounting bracket as shown on Figure 3 of Instruction Manual. Use four each 7/16-20x3/4 bolts with washers. Torque to 250 in. lbs.

_____ _____ /_____
Torque Wrench No. I&C Sign-Off Date

D8. Attach transmitter and mounting plate to the Unistrut installed in Step D5. Use essential commercial grade 3/8 x 3/4, ASTM A307 bolts and Unistrut nuts. Torque to 19 ft. lbs.

_____ _____ / _____
Torque Wrench No. I&C Sign-Off Date

D9. Attach 6x4x4 Hoffman enclosure to mounting plate and Unistrut. Plate fabricated in Step B6. Use essential commercial grade 1/4 x 3/4 ASTM A307 bolts and washers. Hoffman received under PO 250165.

_____ / _____
Electrical Sign-Off Date

D10. Ensure the Electrical Installation section of the Rosemount Instruction Manual 4302, Rev. C, has been read prior to proceeding with the following steps.

_____ / _____
Electrical Sign-Off Date

_____ / _____
I&C Sign-Off Date

D11. Two conduit hubs are provided. Choose one based on convenience of tying to Hoffman enclosure and plug the other using 1/2-14NPT stainless steel pipe plug and thread sealant. Torque to 150 in.lbs.

_____ _____ / _____
Torque Wrench No. Electrical Sign-Off Date

D12. Install Rosemount Model 353C nuclear qualified conduit seal using thread sealant on the transmitter side. Torque to 150 in. lbs. The short 12-inch leads are the transmitter side. Seals are received under PO 250615.

_____ _____ / _____
Torque Wrench No. Electrical Sign-Off Date

D13. Install oil tight conduit from the transmitter conduit seal to the local Hoffman enclosure.

_____ / _____
Electrical Sign-Off Date

D14. Install 3/4-inch rigid conduit from the local Hoffman enclosure to TB222 at Instrument Rack 25-62. See NPPD Drawing SKE-EE-67, Sheets 1 and 2 for conduit route and hanger locations.

_____ / _____
Electrical Sign-Off Date

D15. Pull and terminate Cable IT344, ITP, No. 16 SH from local Hoffman enclosure to TB292 at Instrument Rack 25-62. Cable has been requisitioned from Cable Contact 84-050 and is stored at warehouse location WH-3-12-M. Raychem splice IT344 to Cable RH37 in TB222 in accordance with CNS Splice Procedure M.P.7.3.26. Raychem splice Cable IT344 to Rosemount conduit seal in local Hoffman enclosure. See NPPD Drawing SKE-EE-66 for terminations.

_____ / _____
Electrical Sign-Off Date

_____ / _____
Q.C. Sign-Off Date

D16. Terminate Cables RH37 and IT339 in RTD CAB "B" as shown on NPPD Drawing SKE-EE-66.

_____ / _____
Electrical Sign-Off Date

D17. Connect Rosemount conduit seal to Transmitter RW-LT-830 as shown on NPPD Drawing SKE-EE-66. Torque each screw to 5 in. lbs. Do not tighten down cover at this time.

_____ _____ / _____
Torque Wrench No. I&C Sign-Off Date

D18. Isolate Sump 1C by closing Valve 773AV-123-F. Tag the valve closed. There will be one 4-inch drain line near the top that can not be isolated. This line should be stopped with an inflatable rubber plug. Reference B&R Drawing 2038.

_____ _____ / _____
Clearance Order No. Operator Sign-Off Date

D19. Manually pump the level of Sump 1C to the lowest level possible without damaging the pump using either sump pump. At this point, use a portable sump pump and remove the remaining water and store in drums.

_____ / _____
Maintenance Sign-Off Date

D20. De-energize and tag open the Reactor Building floor drain Sump Pumps 1C-1 and 1C-2 by opening Breaker 2E at MCC-R and Breaker 3D at MCC-S. Reference B&R Drawing 3006, Sheet 5, and Drawing 3007, Sheet 6.

_____ _____ / _____
Clearance Order No. Operator Sign-Off Date

D21. Cut a 8-inch diameter hole in the top of Sump 1C. Due to lack of drawings detailing obstructions within the sump, this hole will be field located once access to the sump is achieved.

_____ / _____
Maintenance Sign-Off Date

D22. Install the remote diaphram seal bracket fabricated in Step B3 at Reactor Sump 1C as shown on NPPD Drawing SKE-EE-67, Sheet 3.

_____ / _____
Maintenance Sign-Off Date

D23. Install remote diaphram seal for Level Transmitter RW-LT-830 in Sump 1C as shown on NPPD Drawing SKE-67, Sheet 3.

_____ / _____
I&C Sign-Off Date

D24. Install DC Fuse FU830 (1/4 Amp) at Control Room Panel VBD-S as shown on NPPD Drawing SKE-EE-64. Loop calibrate level Transmitter RW-LT-830 to level Indicator RW-LI-830 at Panel VBD-S and PMIS Computer Point N341. See NPPD Drawing SKE-EE-75 for calibration data.

_____ / _____
I&C Sign-Off Date

D25. Inspect electrical housing cover and O-ring for cleanliness. If chips and dirt are present, clean per Rosemount Instruction Manual.

_____ / _____
I&C Sign-Off Date

D26. Install electrical housing covers and torque to 200 in. lbs.

_____ _____ / _____
Torque Wrench No. I&C Sign-Off Date

D27. Visual inspection by Engineering.

_____ / _____
Engineer Sign-Off Date

D28. Notify the Control Room of completion installation and that Transmitter RW-LT-830 and Indicator RW-LI-830 are ready for service. In addition, remove inflatable rubber plugs installed in Step D20, remove tagging orders placed in Step D20, and return Sump Pumps 1-C1 and 1-C2 to service.

_____ / _____
Operator Sign-Off Date

D29. Drain drums of water removed in Step D19 back into the Reactor Building floor drain Sump 1C. Dispose of drums in accordance with radiation protection procedures.

_____ /_____
Maintenance Sign-Off Date

Section E

Note: Steps E1 through E17 may be performed while the reactor is critical. Steps E18 through E29 should be performed with the reactor in cold shutdown and after Section A of this Design Change has been completed.

E1. Notify the Control Room shift supervisor of installation and request clearance.

_____ /_____
Shift Supervisor Sign-Off Date

E2. Perform bench test calibration of Level Transmitter RW-LT-831 for Sump 1D. Instrumentation received under PO 250615. See NPPD Drawing SKE-EE-75 for calibration data.

_____ /_____

E3. Ensure the Mechanical Installation section of the Rosemount Installation Manual 4302, Rev. C, has been read prior to proceeding with the following steps.

_____ /_____
Electrical Sign-Off Date

_____ /_____
I&C Sign-Off Date

E4. Using a 1/2-inch masonry drill bit, drill six holes in the concrete to a depth of 1 3/4" as shown on NPPD Drawing SKE-EE-76. Care must be taken to ensure when drilling that when the transmitter is mounted, the center line of the transmitter is exactly seven feet above the floor. Horizontal positioning is allowed to avoid rebar. The transmitter capillary tubing is 30 ft. long so the transmitter assembly should be positioned on the wall, center of the sump.

_____ /_____
Electrical Sign-Off Date

E5. Insert essential commercial grade 3/8-inch Hilti Drop In Anchors in each hole and attach the Unistrut cut in Step B7. Use 3/8" x 3/4" essential commercial grade bolts and washers. Torque to 25 ft. lbs. See NPPD Drawing SKE-EE-76.

_____ _____ /_____
Torque Wrench No. Electrical Sign-Off Date

E6. Attach the Rosemount bracket to the mounting plate fabricated in Step B5 as shown on Figure 3 of the Rosemount Instruction Manual. Use four each 5/16-18 stainless steel bolts and nuts (ASTM A-193, Class 2, Grade B-8). Torque each bolt to 200 in. lbs.

Torque Wrench No. _____ I&C Sign-Off _____ / Date

E7. Bolt new Transmitter RW-LT-830 to mounting bracket as shown on Figure 3 of Instruction Manual. Use four each 7/16-20x3/4 bolts with washers. Torque to 250 in. lbs.

Torque Wrench No. _____ I&C Sign-Off _____ / Date

E8. Attach transmitter and mounting plate to the Unistrut installed in Step E5. Use essential commercial grade 3/8 x 3/4, ASTM A307 bolts, washers, and Unistrut nuts. Torque to 19 ft. lbs.

Torque Wrench No. _____ I&C Sign-Off _____ / Date

E9. Attach 6x4x4 Hoffman enclosure to mounting plate and Unistrut. Plate fabricated in Step B6. Use essential commercial grade 1/4 x 3/4 ASTM A307 bolts, washers, and Unistrut nuts. Hoffman received under PO 250165. See NPPD Drawing SKE-EE-76.

Electrical Sign-Off _____ / Date

E10. Ensure the Electrical Installation section of the Rosemount Instruction Manual 4302, Rev. C, has been read prior to proceeding with the following steps.

Electrical Sign-Off _____ / Date

I&C Sign-Off _____ / Date

E11. Two conduit hubs are provided. Choose one based on convenience of tying to Hoffman enclosure and plug the other using 1/2-14NPT stainless steel pipe plug and thread sealant. Torque to 150 in.lbs.

Torque Wrench No. _____ Electrical Sign-Off _____ / Date

E12. Install Rosemount Model 353C nuclear qualified conduit seal using thread sealant on the transmitter side. Torque to 150 in. lbs. The short 12-inch leads are the transmitter side. Seals are received under PO 250615.

Torque Wrench No. _____ Electrical Sign-Off _____ / Date

E13. Install oil tight conduit from the transmitter conduit seal to the local Hoffman enclosure.

_____ /_____
Electrical Sign-Off Date

E14. Install 3/4-inch rigid conduit from the local Hoffman enclosure to TB226 at Instrument Rack 25-60. See NPPD Drawing SKE-EE-67, Sheets 1 and 2 for conduit route and hanger locations.

_____ /_____
Electrical Sign-Off Date

E15. Pull and terminate Cable IT345, ITP, No. 16 SH from local Hoffman enclosure to TB226 at Instrument Rack 25-60. Cable has been requisitioned from Cable Contact 84-050 and is stored at warehouse location WH-3-12-M. Raychem splice IT345 to Cable CS59 in TB226 in accordance with CNS Splice Procedure M.P.7.3.26. Raychem splice Cable IT345 to Rosemount conduit seal in local Hoffman enclosure. See NPPD Drawing SKE-EE-66 for terminations.

_____ /_____
Electrical Sign-Off Date

_____ /_____
Q.G. Sign-Off Date

E16. Terminate Cables CS59 and IT339 in RTD CAB "B" as shown on NPPD Drawing SKE-EE-66.

_____ /_____
Electrical Sign-Off Date

E17. Connect Rosemount conduit seal to Transmitter RW-LT-831 as shown on NPPD Drawing SKE-EE-66. Torque each screw to 5 in. lbs. Do not tighten down cover at this time.

_____ _____ /_____
Torque Wrench No. I&C Sign-Off Date

E18. Isolate Sump 1D by closing Valves 769AV-123-F and 772AV-123-F. Tag valves closed. There will be two 4-inch lines that can not be isolated . These lines should be stopped with inflatable rubber plugs. Reference B&R Drawing 2038.

_____ _____ /_____
Clearance Order No. Operator Sign-Off Date

E19. Manually pump the level of Sump 1D to the lowest level possible without damaging the pump using either sump pump. At this point, use a portable sump pump and remove the remaining water, storing in drums.

_____ /_____
Maintenance Sign-Off Date

E20. De-energize and tag open the Reactor Building floor drain Sump Pumps 1D-1 and 1D-2 by opening Breaker 2F at MCC-R and Breaker 1E at MCC-S. Reference B&R Drawing 3006, Sheet 5, and Drawing 3007, Sheet 6.

_____ _____ /_____
Clearance Order No. Operator Sign-Off Date

E21. Cut a 8-inch diameter hole in the top of Sump 1D. Due to lack of drawings detailing obstructions within the sump, this hole will be field located once access to the sump is achieved.

_____ /_____
Maintenance Sign-Off Date

E22. Install the remote diaphram seal bracket (fabricated in Step B3) at Reactor Floor Sump 1D as shown on NPPD Drawing SKE-EE-67, Sheet 3.

_____ /_____
Maintenance Sign-Off Date

E23. Install remote diaphram seal for Level Transmitter RW-LT-831 in Sump 1D as shown on NPPD Drawing SKE-EE-67, Sheet 3.

_____ /_____
I&C Sign-Off Date

E24. Install DC Fuse FU831 (1/4 Amp) at Control Room Panel VBD-S as shown on NPPD Drawing SKE-EE-64. Loop calibrate level Transmitter RW-LT-831 to level Indicator RW-LI-831 at Panel VBD-S and PMIS Computer Point N342. See NPPD Drawing SKE-EE-75 for calibration data.

_____ /_____
I&C Sign-Off Date

E25. Inspect electrical housing cover and O-ring for cleanliness. If chips and dirt are present, clean per Rosemount Instruction Manual.

_____ /_____
I&C Sign-Off Date

E26. Install electrical housing covers and torque to 200 in. lbs.

_____ _____ /_____
Torque Wrench No. I&C Sign-Off Date

E27. Visual inspection by Engineering.

_____ /_____
Engineer Sign-Off Date

E28. Notify the Control Room of completion of installation and that Transmitter RW-LT-831 and Indicator RW-LI-831 are ready for service. In addition, remove inflatable rubber plugs installed in Step E18, remove tagging orders placed in Step E18, and return Sump Pumps 1-D1 and 1-D2 to service.

_____ / _____
Operator Sign-Off Date

E29. Drain drums of water removed in Step E19 back into the Reactor Building floor drain Sump 1D. Dispose of drums in accordance with radiation protection procedures.

_____ / _____
Maintenance Sign-Off Date

Section F

Note: Steps F1 through F19 may be performed while the reactor is critical. Steps F20 through F27 should be performed after Section A of this Design Change has been completed.

F1. Notify the Control Room shift supervisor of installation and request clearance.

_____ / _____
Shift Supervisor Sign-Off Date

F2. Perform bench test calibration of Level Transmitter RW-LT-900. Instrumentation received under PO 250615. See NPPD Drawing SKE-EE-75 for calibration data.

_____ / _____
I&C Sign Off Date

F3. Ensure the Mechanical Installation section of the Rosemount Instruction Manual 4302, Rev. C, has been read prior to proceeding with the following steps.

_____ / _____
Electrical Sign-Off Date

_____ / _____
I&C Sign-Off Date

F4. Using a 1/2-inch masonry drill bit, drill six holes in the concrete to a depth of 1 3/4" as shown on NPPD Drawing SKE-EE-76. Care must be taken to ensure when drilling that when the transmitter is mounted, the center line of the transmitter is exactly seventeen feet above the floor. Horizontal positioning is allowed to avoid rebar. The new location for Transmitter RW-LT-900 will be inside the torus area, on the platform above torus level Transmitters PC-LT-11 and PC-LT-12.

_____ / _____
Electrical Sign-Off Date

F5. Insert essential commercial grade 3/8-inch Hilti Drop In Anchors in each hole and attach the Unistrut cut in Step B7. Use 3/8" x 3/4" essential commercial grade bolts and washers. Torque to 25 ft. lbs. See NPPD Drawing SKE-EE-76.

_____ _____ /_____

Torque Wrench No. Electrical Sign-Off Date

F6. Attach the Rosemount bracket to the mounting plate fabricated in Step B5 as shown on Figure 3 of the Rosemount Instruction Manual. Use four each 5/16-18 stainless steel bolts and nuts (ASTM A-193, Class 2, Grade B-8). Torque each bolt to 200 in. lbs.

_____ _____ /_____

Torque Wrench No. I&C Sign-Off Date

F7. Bolt new Transmitter RW-LT-900 to mounting bracket as shown on Figure 3 of Instruction Manual. Use four each 7/16-20x3/4 bolts with washers. Torque to 250 in. lbs.

_____ _____ /_____

Torque Wrench No. I&C Sign-Off Date

F8. Attach the transmitter and mounting plate to the Unistrut installed in Step F5. Use essential commercial grade 3/8 x 3/4, ASTM A307 bolts, washers, and Unistrut nuts. Torque to 19 ft. lbs.

_____ _____ /_____

Torque Wrench No. I&C Sign-Off Date

F9. Attach 6x4x4 Hoffman enclosure to mounting plate and Unistrut. Plate was fabricated in Step B6. Use essential commercial grade 1/4 x 3/4 ASTM A307 bolts, washers, and Unistrut nuts. Hoffman received under PO 250165. See NPPD Drawing SKE-EE-76.

_____ /_____

Electrical Sign-Off Date

F10. Ensure the Electrical Installation section of the Rosemount Instruction Manual 4302, Rev. C, has been read prior to proceeding with the following steps.

_____ /_____

Electrical Sign-Off Date

_____ /_____

I&C Sign-Off Date

F11. Two conduit hubs are provided on the transmitter. Choose one based on convenience of tying to Hoffman enclosure and plug the other using 1/2-14NPT stainless steel pipe plug and thread sealant. Torque to 150 in.lbs.

_____ _____ /_____

Torque Wrench No. Electrical Sign-Off Date

F12. Install Rosemount Model 353C nuclear qualified conduit seal using thread sealant on the transmitter side. Torque to 150 in. lbs. The short 12-inch leads are the transmitter side. Seals are received under PO 250615.

_____ _____ / _____

Torque Wrench No. Electrical Sign-Off Date

F13. Install oil tight conduit from the transmitter conduit seal to the local Hoffman enclosure.

_____ / _____

Electrical Sign-Off Date

F14. Install 3/4-inch rigid conduit from the local Hoffman enclosure to TB222 at Instrument Rack 25-62 in the SW quad. Field route on existing DC starter hangers.

_____ / _____

Electrical Sign-Off Date

F15. Pull and terminate Cable IT346, ITP, No. 16SH from local Hoffman enclosure to TB222 at Instrument Rack 25-62. Cable has been requisitioned from Cable Contact 84-050 and is stored at warehouse location WH-3-12-M. Raychem splice IT346 to Cable RH39 in TB222 in accordance with CNS Splice Procedure M.P.7.3.26. Raychem splice Cable IT346 to Rosemount conduit seal at local Hoffman enclosure. See NPPD Drawing SKE-EE-66 for terminations.

_____ / _____

Electrical Sign-Off Date

_____ / _____

Q.C. Sign-Off Date

F16. Terminate Cables RH39 and IT341 in RTD CAB "B" as shown on NPPD Drawing SKE-EE-66.

_____ / _____

Electrical Sign-Off Date

F17. Connect Rosemount conduit seal to Transmitter RW-LT-900 as shown on NPPD Drawing SKE-EE-66. Torque each screw to 5 in. lbs. Do not tighten down cover at this time.

_____ _____ / _____

Torque Wrench No. I&C Sign-Off Date

F18. Install the remote diaphram seal bracket fabricated in Step B4 on the floor of the torus area below the transmitter as shown on NPPD Drawing SKE-EE-67.

_____ / _____

Maintenance Sign-Off Date

F19. Install the remote diaphram seal for Level Transmitter RW-LT-900 in bracket installed in previous step.

_____ / _____
I&C Sign-Off Date

F20. Isolate the air supply to existing Level Transmitter RW-LT-900 by closing the valve prior to Solenoid Valve FIC-SPV-900. Cap the line off. Reference B&R Drawing I.D.-124, Sheet 138.

_____ / _____
I&C Sign-Off Date

F21. Remove the 1/4-inch copper tubing running from RW-LT-900 to the floor of the torus area. Discard.

_____ / _____
I&C Sign-Off Date

F22. Remove Solenoid Valve FIC-SPV-900, Air Regulator, Flow Indicating Controller FIC-900, and Level Transmitter RW-LT-900. Label this equipment and return to spare parts in accordance with radiation protection procedures. Reference B&R Drawing I.D.-124, Sheet 138.

_____ / _____
I&C Sign-Off Date

F23. Install DC Fuse FU900 (1/4 Amp) at Control Room Panel VBD-S as shown on NPPD Drawing SKE-EE-64. Loop calibrate level Transmitter RW-LT-900 to level Indicator RW-LI-900 at Panel VBD-S. See NPPD Drawing SKE-EE-75 for calibration data. Verify Alarm Module RW-AM-900 alarms at 4.2 mA (2 1/2") increasing. Should annunciate at Annunciator S-1, Window 6-2.

_____ / _____
I&C Sign-Off Date

F24. Inspect electrical housing cover and O-ring for cleanliness. If chips and dirt are present, clean per Rosemount Instruction Manual.

_____ / _____
I&C Sign-Off Date

F25. Install electrical housing covers and torque to 200 in. lbs.

_____ _____ / _____
Torque Wrench No. I&C Sign-Off Date

F26. Visual inspection by Engineering.

_____ / _____
Engineer Sign-Off Date

F27. Notify Control Room of completion of installation and that Transmitter RW-LT-900 is ready to return to service.

_____ /_____
Shift Supervisor Sign-Off Date

XIII. QC IMPLEMENTATION CHECKLIST

The QC Checklist has been incorporated in the installation procedure section of this Design Change.

IX. ACCEPTANCE OF TEST PROCEDURE

A. Insert a voltmeter on the 250VAC range between Terminal 404 and ground in Panel VBD-S. Place the selector switch for Electric Manhole Sump Pump W (Item 38) to the ON position and verify the pump starts. Reference B&R Drawing 3040, Sheet 9, and Honeywell Drawing 1550-204.

_____ /_____
Operator Sign-Off Date

B. Move the selector switch to OFF then AUTO and verify the voltmeter indicates 120VAC. This verifies the auto operation contact is wired correctly. If a high level is present in the manhole, the pump will start.

_____ /_____
Operator Sign-Off Date

C. Insert a voltmeter on the 250VAC range between Terminal 415 and ground in Panel VBD-S. Place the selector switch for Electric Manhole Sump Pump Y (Item 39) to the ON position and verify the pump starts. Reference B&R Drawing 3040, Sheet 9, and Honeywell Drawing 1550-204.

_____ /_____
Operator Sign-Off Date

D. Move the selector switch to OFF then AUTO and verify the voltmeter indicates 120VAC. This verifies the auto operation contact is wired correctly. If a high level is present in the sump, the pump will start.

_____ /_____
Operator Sign-Off Date

E. Place a voltmeter on the 250VAC range between Terminal 426 and ground in Panel VBD-S. Place the selector switch for the ERP Sump Pump 1Z-1 (Item 44) in the ON position and verify the pump starts. Verify the Start Counter (Item 52) increases by one and verify the Run Meter (Item 54) starts to increase. Reference B&R Drawings 3040, Sheet 9; 3069, Sheet 21; and Honeywell Drawing 1550-204.

_____ / _____

Operator Sign-Off Date

F. Move the selector switch to OFF then AUTO and verify the voltmeter indicates 120VAC. This verifies the auto operation contact is wired correctly. If a high level is present, the sump pump will start.

_____ / _____

Operator Sign-Off Date

G. Insert a voltmeter on the 250VAC range between Terminal 437 and ground in Panel VBD-S. Place the selector switch for ERP Sump Pump 1Z-2 (Item 45) in the ON position and verify the pump starts. Verify the Start Counter (Item 53) increases by one. Verify the Run Meter (Item 55) increases. Reference B&R Drawings 3040, Sheet 9; 3069, Sheet 21, and Honeywell Drawing 1550-204.

_____ / _____

Operator Sign-Off Date

H. Move the selector switch to OFF then AUTO and verify the voltmeter indicates 120VAC. This verifies the auto operation contact is wired correctly. If a high level is present, the sump pump will start.

_____ / _____

Operator Sign-Off Date

I. Engineering review of Panel VBD-S. Inspect for correctness, neatness, and quality craftsmanship.

_____ / _____

Engineer Sign-Off Date

J. Engineering review of loop calibration data sheets for torus area level instrumentation.

_____ / _____

Engineer Sign-Off Date

K. Engineering review of loop calibration data sheets for the Reactor Building Sump A and area level instrumentation.

_____ / _____

Engineer Sign-Off Date

L. Engineering review of loop calibration data sheets for the Reactor Building Sump B and area level instrumentation.

_____ / _____
Engineer Sign-Off Date

M. Engineering review of loop calibration data sheets for the Reactor Building Sump C and area level instrumentation.

_____ / _____
Engineer Sign-Off Date

N. Engineering review of loop calibration data sheets for the Reactor Building Sump D and area level instrumentation.

_____ / _____
Engineer Sign-Off Date

X. COST ESTIMATE

Work Order for Modification Labor 26962 2400
Work Order for Enhancement Labor 26962 2300

A. Material

Quantity	Description/Purchase Order	Price
1 Lot	Raychem Splice Material (PO _____)	_____.__
5	A-6044CH Hoffman Wiring Enclosures (PO 250165)	75.90
5	1136VB4-20DCMA International Instruments Indicators (PO 250776)	1,245.00
6	1153DB5PE Rosemount Nuclear Level Transmitter with 1159C30A Remote Diaphram Seals (PO 250615)	42,300.00
6	353C Nuclear Conduit Seals (PO 250615)	2,370.00
1 Tube	1153-0051-0001 Nuclear Grade Thread Sealant (PO 250615)	50.00
2	ET-1218 RIS Alarm Module (PO _____)	4,880.00
3	_____ Power Supplies (PO _____)	_____.__
1	4 ft. x 4 ft. Essential Commercial ASTM A36 or A516 Gr. 70 Steel Plate (CNS Spares) (For Mounting Plate and Brackets)	100.00

Quantity	Description/Purchase Order	Price
15 ft.	P3300 Essential Commercial Grade Unistrut (CNS Spares)	50.00
2,500 ft.	3TP No. 16SH Cable (Contract 84-050)	1,200.00
600 ft.	1TP No. 16SH Cable (Contract 84-050)	300.00
100 ft.	No. 12 Stranded Firewall Switchboard Wire (CNS No. 16162)	40.00
50 ft.	3C No. 12 Cable (Contract 84-050)	25.00
300 ft.	3/4" Rigid Conduit (CNS Spares)	500.00
100 ft.	3/4" Oil Tight Conduit (CNS Spares)	200.00
1	24" x 24" x 3/16" Grade A-36 Plate Steel (PO 251950) (For Panel Repair Only)	75.00
	Total	_____.__

B. Labor

Engineering	220 Man-hours
Mechanical	50 Man-hours
Electrical	150 Man-hours
Instrument and Control	100 Man-hours
Operations	25 Man-hours

XI. DOCUMENT CHANGES

B&R Dwg. 3050 Series
B&R Dwg. M-106, Rev. 3
B&R Dwg. 3255, Sheet 55, Rev. 4
B&R Dwg. 3255, Sheet 72, Rev. 2
B&R Dwg. 3255, Sheet 79, Rev. 1
B&R Dwg. 3257, Sheet 1, Rev. 8
B&R Dwg. 3257, Sheet 2, Rev. 4
B&R Dwg. 3254, Sheet 12, Rev. 1
B&R Dwg. 3254, Sheet 13, Rev. 3
B&R Dwg. 3257, Sheet 52, Rev. 2
B&R Dwg. E507, Sheet 74, Rev. 2
B&R Dwg. 3214, Sheet 2
Honeywell Dwg. 1550-204, Rev. 1
GE Dwg. 117C3303, Sheet 3, Rev. 2
GE Dwg. 117C3325, Sheet 3, Rev. 2
GE Dwg. 117C3326, Sheet 3, Rev. 1
CNS Operating Procedure 2.3.2.20, Annunciator S-1
CNS Operating Procedure 2.3.2.18, Annunciator R-1

XII. OPERATIONS SIGN-OFF

Operations has received copies of all required interim drawings to assure safe and knowledgeable operation of this modified system.

_____ /_____
Operations Supervisor Sign-Off Date

XIII. TRAINING SIGN-OFF

Training has received, as required, sufficient training instructions with respect to the Design Change to provide the training necessary to assure safe and knowledgeable operation of the modified system.

_____ /_____
Training Sign-Off Date

XIV. ATTACHMENTS

NPPD Dwg. SKE-EE-59, Annunciator S-1 Prior to Modification
NPPD Dwg. SKE-EE-60, Annunciator S-1 After Modification
NPPD Dwg. SKE-EE-61, VBD-S Prior to Modification
NPPD Dwg. SKE-EE-62, VBD-S After Modification
NPPD Dwg. SKE-EE-63, VBD-S Detailed Construction
NPPD Dwg. SKE-EE-64, VBD-S Rear Layout
NPPD Dwg. SKE-EE-66, Transmitter Wiring Diagram
NPPD Dwg. SKE-EE-67, Sheet 1, Conduit Route and Hangers
NPPD Dwg. SKE-EE-67, Sheet 2, Conduit Route and Hangers
NPPD Dwg. SKE-EE-67, Sheet 3, Remote Seal Mounts
NPPD Dwg. SKE-EE-75, Transmitter Calibration Data
NPPD Dwg. SKE-EE-76, Mounting Plates Diagram
NEDC 86-007 Electrical Loading Calculation
Design Input Checklist
Independent Design Verification Checklist
Preventive Maintenance Instructions and Schedules Review
Equipment Spare Parts Inventory Review
10CFR50.59 Reportability Analysis
Station Safety Evaluation
Engineering Data File Review

INDEPENDENT DESIGN VERIFICATION CHECKLIST

DC NUMBER: 85-15D

DESIGN REVIEW	YES	N/A
Critical review to provide assurance that design documents such as drawings, calculations, analyses, or specifications are correct and satisfactory, where applicable:		
Were the inputs correctly selected and incorporated into design (see Attachment "D")?	___	___
Are assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent re-verification when the detailed design activities are completed?	___	___
Are the appropriate quality and quality assurance requirements specified?	___	___
Are the applicable codes, standards, and regulatory requirements including issue and addenda properly identified and are their requirements for design met?	___	___
Have applicable construction and operating experience been considered?	___	___
Have the design interface requirements been satisfied?	___	___
Was an appropriate design method used?	___	___
Is the output reasonable compared to inputs?	___	___
Are the specified parts, equipments, and processes suitable for the required application?	___	___
Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?	___	___
Have adequate maintenance features and requirements been specified?	___	___
Are accessibility and other design provisions adequate for performance of needed maintenance and repair?	___	___
Has adequate accessibility been provided to perform the inservice inspection expected to be required during the plant life?	___	___
Has the design properly considered radiation exposure to the public and plant personnel?	___	___

INDEPENDENT DESIGN VERIFICATION CHECKLIST

	YES	N/A
Are the acceptable criteria incorporated in the design documents sufficiently to allow verification that design requirements have been satisfactorily accomplished?	___	___
Have adequate preoperational and subsequent periodic test requirements been appropriately specified?	___	___
Are adequate handling, storage, cleaning, and shipping requirements specified?	___	___
Are adequate identification requirements specified?	___	___
Are requirements for record preparation review, approval, retention, etc., adequately specified?	___	___

ALTERNATE CALCULATIONS

Verification of some types of calculations or analysis may be achieved by comparison with alternate methods of calculation or analyses. The alternate method used for comparison may be a more simplified approach or less rigorous, such as a hand calculation to check a computer code output.

Not Applicable. _____

Attached. _____

QUALIFICATION TESTING

Design verification for some designs or specific design features can be achieved by suitable qualification testing of a prototype or initial production unit.

Not Applicable. _____

Attached. _____

Performed By: _____ Date: _____

DESIGN INPUT CHECKLIST

DC NUMBER: 85-15D

The Design Input Evaluation Shall Include But Is Not Limited To The Following, Where Applicable:

	YES	N/A
License, Technical Specifications Change.		X
Quality Standard Specified.	X	
Essential Classification.	X	
10CFR50.59 Analysis (Required).	X	
Reportable Under 10CFR50.59.		X
Reportable Under Other NRC Annual Report Criteria.		X
Revised Copy Of USAR And/Or Technical Specifications Change Attached.		X
Safety Analysis Included (Required).	X	
Fire Hazard Analysis Included (Required).	X	
Completion Acceptance Criteria Specified.	X	
Procedures, Drawings, And VTI Affected Specified.	X	
Q.C. Checklist For Implementation Of DC (Required).	X	
Change To ISI/IST Program.		X
Training Instructions.		X
Contains Security Safeguards Information.		X
Harsh Environment.	X	
Basic Functions Of Each Structure, System, And Component.	X	
Performance Requirements Such As Capacity, Rating, And System Output.	X	
Codes, Standards, And Regulatory Requirements Including Applicable Issue And/Or Addenda.	X	
Power Piping (ANSI B31.1), Nuclear Power Piping (ANSI B31.1), And Nuclear Power Plant Components (ASME Section III) Code Requirements Including Design, Material Acceptability, Fabrication, Installation, Examination (NDE), And Testing.	X	

DESIGN INPUT CHECKLIST

	YES	N/A
Design Conditions Such As Pressure, Temperature, Fluid Chemistry, And Voltage.	X	
Loads Such As Seismic, Wind, Thermal, And Dynamic.	X	
Environmental Conditions Anticipated During Storage, Construction, And Operation Such As Pressure, Temperature, Humidity, Corrosiveness, Site Elevation, Wind Direction, Nuclear Radiation, Electromagnetic Radiation, And Duration Of Exposure.	X	
Interface Requirements Including Definition Of Functional And Physical Interfaces Involving Structures, Systems, And Components.	X	
Material Requirements Including Such Items As Compatibility, Electrical Insulation Properties, Protective Coating, Corrosion Resistance, And Design Code Acceptability.	X	
Mechanical Requirements Such As Vibration, Stress, Shock, And Reaction Forces.	X	
Structural Requirements Covering Such Items As Equipment Foundations And Pipe Supports.		X
Bolting And Bolted Connection Design Requirements Including Bolt Preload, Torque Calculations, Bolt Materials, And Gaskets.		X
Hydraulic Requirements Such As Pump Net Positive Suction Heads (NPSH), Allowable Pressure Drops, And Allowable Fluid Velocities.		X
Chemistry Requirements Such As Provisions For Sampling And Limitations On Water Chemistry.		X
Electrical Requirements Such As Source Of Power Voltage, Raceway Requirements, Electrical Insulation, And Motor Requirements.	X	
Layout And Arrangement Requirements.	X	
Operational Requirements Under Various Conditions, Such As Plant Startup, Normal Plant Operation, Plant Shutdown, Plant Emergency Operation, Special Or Infrequent Operation, And System Abnormal Or Emergency Operation.	X	
Instrumentation And Control Requirements Including Indicating Instruments, Controls And Alarms Required For Operation, Testing, And Maintenance. Other Requirements Such As The Type Of Instrument, Installed Spares, Range Of Measurement, And Location Of Indication Should Also Be Included.	X	

DESIGN INPUT CHECKLIST

	YES	N/A
Access And Administrative Control Requirements For Plant Security.		X
Redundancy, Diversity, And Separation Requirements Of Structures, Systems, And Components.	X	
Failure Effects Requirements Of Structures, Systems, And Components, Including A Definition Of Those Events And Accidents Which They Must Be Designed To Withstand.	X	
Test Requirements Including In-Plant Tests And The Conditions Under Which They Will Be Performed.		X
Accessibility, Maintenance, Repair, And Inservice Inspection Requirements For The Plant Including The Conditions Under Which These Will Be Performed.	X	
Personnel Requirements And Limitations Including The Qualification And Number Of Personnel Available For Plant Operation, Maintenance, Testing And Inspection And Permissible Personnel Radiation Exposures For Specified Areas And Conditions.		X
Transportability Requirements Such As Size And Shipping Weight, Limitations, I.C.C. Regulations.		X
Fire Protection Or Resistance Requirements.		X
Handling, Storage, And Shipping Requirements.		X
Other Requirements To Prevent Undue Risk To The Health And Safety Of The Public.		X
Materials, Processes, Parts, And Equipment Suitable For Application.	X	
Safety Requirements For Preventing Personnel Injury Including Such Items As Radiation Hazards, Restricting The Use Of Dangerous Materials, Escape Provisions From Enclosures, And Grounding Of Electrical Systems.	X	

Prepared By: Michael A. Parr (Design Engineer) Date: 2-14-86

Reviewed By: _____ (Quality Assurance) Date: _____

Design Engineer Final Review: (Prior To Implementation) _____ Date: _____

PREVENTATIVE MAINTENANCE (PM) INSTRUCTIONS AND SCHEDULES REVIEW

DC/ESC NUMBER: 85-15D

TITLE: CRDR VBD-S Modifications

PM CHANGES: YES: ☒ NO: ☐

NEW PREVENTATIVE MAINTENANCE ITEMS:

RW-LT-828, RW-L1-828
RW-LT-829, RW-L1-829
RW-LT-830, RW-L1-830
RW-LT-831, RW-L1-831

CHANGES TO OR DELETION OF EXISTING PREVENTATIVE MAINTENANCE ITEMS:

RW-LT-900, RW-L1-900, RW-AM-900

DESIGN ENGINEER: Michael A. Parr DATE: 2-14-86

cc: MAINTENANCE MANAGER

EQUIPMENT SPARE PARTS INVENTORY (ESPI) REVIEW

SHEET 1 OF 2

DC/ESC NUMBER: 85-15D

TITLE: CRDR VBD-S Modifications

I. NEW SPARE PARTS (Use Additional Sheets As Required)

RECOMMENDED SPARE PARTS DESCRIPTION	REQUISITION NUMBER PROCURED ON	DATE PARTS INDEX SHEET COMPLETED
1153DB5PE Rosemount Alphaline Nuclear Pressure Transmitter with Model 1159C30A Nuclear Remote Diaphram Seal ET-1218-323 Nuclear Qualified Rochester Inst. System Alarm Module	P.O. 250615	1-23-86

II. OBSOLETE SPARE PARTS (Use Additional Sheets As Required)

CNS PART NUMBER	DESCRIPTION	DATE PARTS INDEX SHEET COMPLETED

III. NO CHANGES TO ESPI (Check Here): ☐

DESIGN ENGINEER: Michael A. Parr DATE: 2-14-86

cc: ADMINISTRATIVE SERVICES MANAGER
MAINTENANCE MANAGER

EQUIPMENT SPARE PARTS INVENTORY (ESPI) REVIEW

SHEET 2 OF 2

DC/ESC NUMBER: 85-15D

TITLE: CRDR VBD-S Modifications

I. NEW SPARE PARTS (Use Additional Sheets As Required)

RECOMMENDED SPARE PARTS DESCRIPTION	REQUISITION NUMBER PROCURED ON	DATE PARTS INDEX SHEET COMPLETED
1136VB4-20DCMA International Instruments Panel Meter	250776	1-30-86

II. OBSOLETE SPARE PARTS (Use Additional Sheets As Required)

CNS PART NUMBER	DESCRIPTION	DATE PARTS INDEX SHEET COMPLETED

III. NO CHANGES TO ESPI (Check Here): ☐

DESIGN ENGINEER: Michael A. Pinn DATE: 2-14-86

cc: ADMINISTRATIVE SERVICES MANAGER
MAINTENANCE MANAGER

ENGINEERING DATA FILE (EDF) REVIEW

SHEET 1 OF 4

DC/ESC NUMBER: 85-15D

TITLE: CRDR VBD-S Modifications

EDF CHANGES: YES: [X] NO: [ ]

NEW COMPONENTS:

See Attached

CHANGES TO EXISTING COMPONENTS:

See Attached

DESIGN ENGINEER: Michael A. Parr DATE: 2-14-86

cc: EDF COORDINATOR
NPRDS CORDINATOR

New Components

CIC: RW-L1-828
MANUF: International Instruments
SUP: International Instruments
CLASS: EQ
MODEL: 1136VB4-20DCMA
LOC: Control Room Panel VBD-S
DESC: Reactor Building Floor Sump 1A and NW Quad Level
PO: 250776

CIC: RW-L1-829
MANUF: International Instruments
SUP: International Instruments
CLASS: EQ
MODEL: 1136VB4-20DCMA
LOC: Control Room Panel VBD-S
DESC: Reactor Building Floor Sump 1B and NE Quad Level
PO: 250776

CIC: RW-L1-830
MANUF: International Instruments
SUP: International Instruments
CLASS: EQ
MODEL: 1136VB4-20DCMA
LOC: Control Room Panel VBD-S
DESC: Reactor Building Floor Sump 1C and SW Quad Level
PO: 250776

CIC: RW-L1-831
MANUF: International Instruments
SUP: International Instruments
CLASS: EQ
MODEL: 1136VB4-20DCMA
LOC: Control Room Panel VBD-S
DESC: Reactor Building Floor Sump 1D and SE Quad Level
PO: 250776

CIC: RW-LT-828
MANUF: Rosemount Inc.
SUP: Rosemount Inc.
CLASS: EQ
MODEL: 1153DB5PE Pressure Transmitter with 1159C30A Remote Diaphram Seal
LOC: 859' NW Quad
DESC: Reactor Building Floor Sump 1A and NW Quad Level
PO: 250615

92-28

CIC: RW-LT-829
MANUF: Rosemount Inc.
SUP: Rosemount Inc.
CLASS: EQ
MODEL: 1153DB5PE Pressure Transmitter with 1159C30A Remote Diaphram Seal
LOC: 859' NE Quad
DESC: Reactor Building Floor Sump 1B and NE Quad Level
PO: 250615

CIC: RW-LT-830
MANUF: Rosemount Inc.
SUP: Rosemount Inc.
CLASS: EQ
MODEL: 1153DB5PE Pressure Transmitter with 1159C30A Remote Diaphram Seal
LOC: 859' SW Quad
DESC: Reactor Building Floor Sump 1C and SW Quad Level
PO: 250615

CIC: RW-LT-831
MANUF: Rosemount Inc.
SUP: Rosemount Inc.
CLASS: EQ
MODEL: 1153DB5PE Pressure Transmitter with 1159C30A Remote Diaphram Seal
LOC: 859' R SE Quad
DESC: Reactor Building Floor Sump 1D and SE Quad Level
PO: 250615

CIC: RW-AM-900
MANUF: Rochester Instrument Systems
SUP: Matney and Co. Inc.
CLASS: EQ
MODEL: ET-1218-323
LOC: Control Room Panel VBD-S
DESC: Torus Area High Level
PO:

CIC: RW-ES-829
MANUF:
SUP:
CLASS: EQ
MODEL:
LOC: Control Room Panel VBD-S
DESC: 24VDC Power Supply 4 Amp
PO:

Changes to Existing Components

CIC: RW-LT-900
MANUF: Rosemount Inc.
SUP: Rosemount Inc.
CLASS: EQ
MODEL: 1153DB5PE Pressure Transmitter with 1159C30A Remote Diaphram Seal
LOC: 859' R NE Torus Area
DESC: Torus Area Level
PO: 250615

CIC: RW-ES-12
MANUF:
SUP:
CLASS:
MODEL:
LOC:
DESC:
PO:

DESIGN CALCULATIONS COVER SHEET

JOB NUMBER: 26962-2200 UNIT NUMBER: _____ DISCIPLINE: EE

NPPD

TITLE: Electrical Loading

STRUCTURE: Control Building

SYSTEM: EE

COMPONENT: CCP Breaker 14

SUPERSEDED CALCULATION NUMBER: N/A

CALCULATION NUMBER: 86-007

NUMBER OF SHEETS: 3

PREPARED BY: Michael A. Parr

CHECKED BY: Brent Kadby

ENGINEERING SUPERVISOR: J. Hadley 2-20-86

*STRESS REPORTS SHALL BE APPROVED BY REGISTERED PE.

CALCULATION DESCRIPTION:

To determine if an additional electrical load to "CPP" Breaker 14 could create any reliability problems.

DESIGN BASIS OR REFERENCES:

USAR Volume IV, Section 8

USAR CHECKED [X] USAR CHANGE REQUIRED [ ] USAR CHANGE NOTIFIED INITIATED [ ]

REVISION NUMBER	REVISION	BY	DATE	CHECKED BY	APPROVED BY*	DATE

ELECTRICAL LOAD OF BREAKER 14

NEDC 86-007

1. SCOPE

To determine the electrical load of Breaker No. 14 of Critical Instrument and Control Power Panel (CCP). This is required to determine if an additional load of one additional instrument power supply, which will drive four level transmitters, could cause an overload of the circuit.

2. APPROACH

a. Determine the existing load on the circuit.

b. Determine the new load to be added.

3. ASSUMPTIONS

This calculation will assume worst case load of existing and new loads. Even though this is an unlikely situation, it shall be used to ensure an adequate margin of safety.

4. RESULTS

a. CCP Breaker No. 14 is a 30 amps breaker with a 20 amps fused output. Reference B&R Drawing 3010.

b. The existing load consists of twelve solenoids, two recorders, two millivolt to current transmitters, one power supply, and one relay.

The solenoids are used to test the suppression chamber vacuum check valves. The solenoids are manufactured by Hannifin, Model T200-25-D2F, with a power consumption of 7.7 watts. Reference CNS EDF files. Each solenoid is independently fused with a 3 amps fuse. Reference Honeywell Drawing 1550-200.

Records PC-PR-20 and PC-TR-21 are Vutronik Model 37302-6023-0110-000-610-43 manufactured by Honeywell Process Control. Each recorder draws a nominal .310 amp and are separately fused at .75 amp. Reference I&C Instruction Manual 69-9 and CNS EDF files.

Transmitters PC-MVI-21A and 21B are Model 39511-4010-321-000 manufactured by Honeywell Process Control. These transmitters each draw an average .066 amp and are fused at 1/8 amp. Reference I&C Instruction Manual 69-23 and CNS EDF files.

Power Supply PC-ES-11 is a Honeywell Model 30666039-1. The power supply input is fused at .5 amp. Reference Honeywell Drawing 1550-D93 and CNS EDF files.

Relay 20-R1 is a Potter & Brumfield Model KRP 11 AG. The power consumption of these relays was not obtainable from the CNS EDF file or from supplier catalogs, however, the relay coil is fused with a 2 amps fuse so this will be used for total load calculation.

C. Determine the total existing load:

1. Each solenoid draws 7.7 watts or .064 amp (I=P/V).

2. Each recorder draws .310 amp.

3. Each millivolt to current transmitter draws .066 amp.

4. Power Supply PC-ES-11 is fused at .5 amp.

5. Relay 20-R1 is fused at 2 amps.

1. = .77 amp
2. = .620 amp
3. = .132 amp
4. = .5 amp
5. = 2.0 amps

Total = 4.022 amps

D. The new power supply will drive four transmitters with .250 fused outputs each or an additional load of one amp.

As determined by the above calculations, the additional loads will have no adverse effect on equipment powered from this source.

5. THEORIES, METHODS, AND REFERENCES

B&R Dwg. 3010, Rev. N17
B&R Dwg. 3255, Sh. 72, Rev. 2
Honeywell Dwg. 1550-D93, Rev. D
Honeywell Dwg. 1550-200, Rev. 1
CNS EDF File
I&C Instruction Manual 69-9
I&C Instruction Manual 69-23

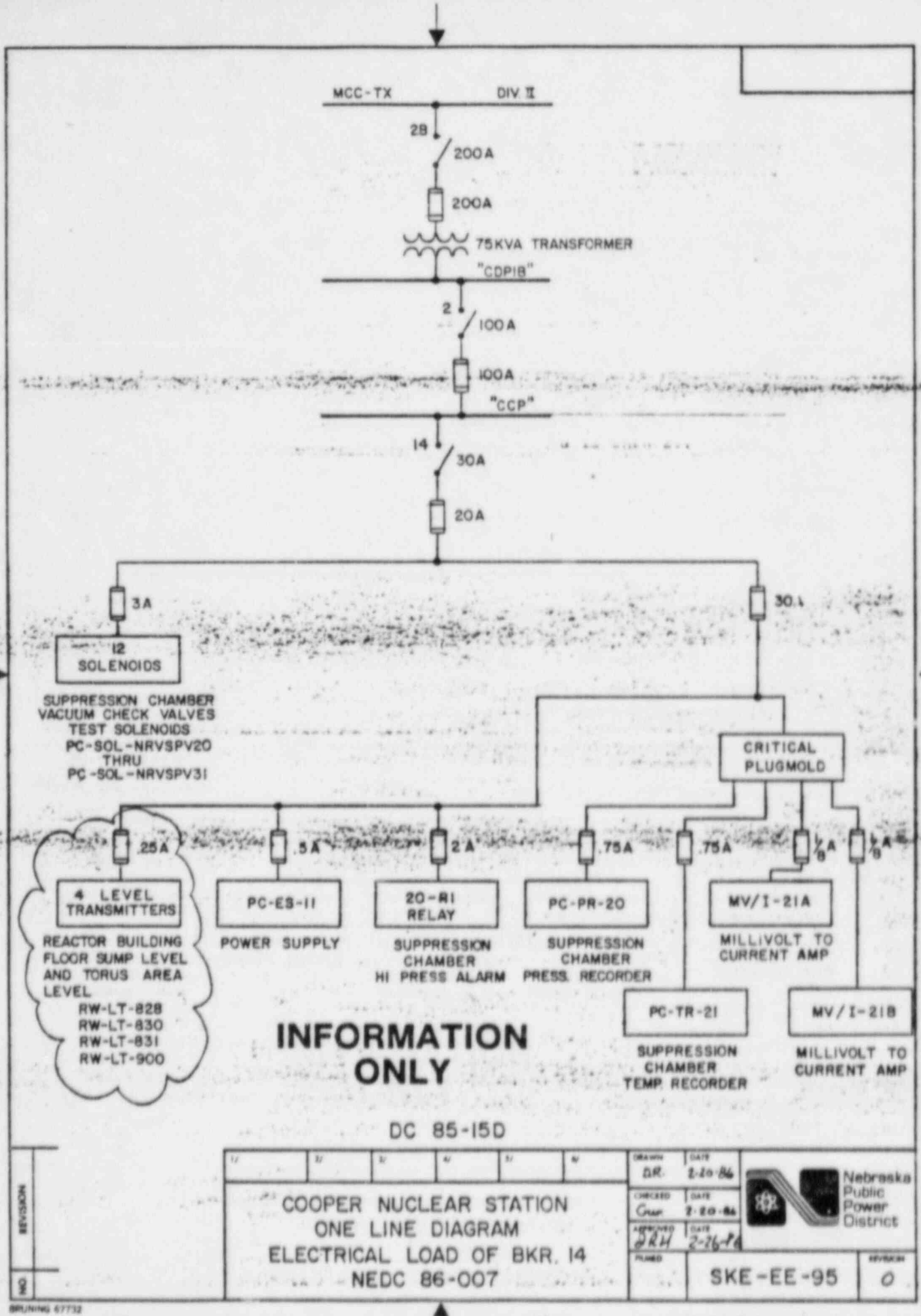
6. MATHEMATICS

1) 7.7/120 = 0.64
.064 x 12 = .77 amp

2) 2 x .310 = .620 amp

3) 2 x .066 = .132 amp

TOTAL .77 + .620 + .132 + .5 + 2 = 4.022 amp


MCC-TX
DIV II
2B
200A
200A
75KVA TRANSFORMER
"CDP1B"
2
100A
100A
"CCP"
14
30A
20A
3A
30A
12 SOLENOIDS
SUPPRESSION CHAMBER VACUUM CHECK VALVES TEST SOLENOIDS PC-SOL-NRVSPV20 THRU PC-SOL-NRVSPV31
CRITICAL PLUGMOLD
.25A
.5A
2A
.75A
.75A
1/8A
1/8A
4 LEVEL TRANSMITTERS
REACTOR BUILDING FLOOR SUMP LEVEL AND TORUS AREA LEVEL
RW-LT-828
RW-LT-830
RW-LT-831
RW-LT-900
PC-ES-11
POWER SUPPLY
20-R1 RELAY
SUPPRESSION CHAMBER HI PRESS ALARM
PC-PR-20
SUPPRESSION CHAMBER PRESS. RECORDER
MV/I-21A
MILLIVOLT TO CURRENT AMP
PC-TR-21
SUPPRESSION CHAMBER TEMP. RECORDER
MV/I-21B
MILLIVOLT TO CURRENT AMP
INFORMATION ONLY
DC 85-15D
REVISION
NO
COOPER NUCLEAR STATION
ONE LINE DIAGRAM
ELECTRICAL LOAD OF BKR. 14
NEDC 86-007
DRAWN DR DATE 2-20-86
CHECKED DATE 2-20-86
APPROVED DATE 2-26-86
PLANT
Nebraska Public Power District
SKE-EE-95
REVISION 0
BRUNING 67732

DC 85-15D
STATION SAFETY EVALUATION

I. PURPOSE

This Station Safety Evaluation is being conducted for DC 85-15D (CRDR VBD-S Modifications). The Design Change shall incorporate human factors engineering principles to Control Room Panel VBD-S. In addition, level instrumentation shall be added to each of the Reactor Building floor sumps with the ranges expanded to monitor for levels above the grade of the sumps.

II. SYSTEMS AFFECTED

A. Control Room Panel VBD-S houses the controls for the station sump systems. The sumps are all part of the Radwaste System. Subsystems include Turbine/Generator Radioactive and Nonradioactive Sumps, Reactor Building Floor and Equipment Drain Sumps, Control Building Sumps, and Elevated Release Point Sumps. The additional level of instrumentation will also be part of the Radwaste System and will interface with the PMIS computer. The interfacing is being completed by Burns and Roe Engineering.

B. Burns and Roe Drawing M-106 reflects an "as-built" of Panel VBD-S prior to modification. NPPD Drawing SKE-EE-62 reflects an "as-built" after modification.

C. Modifications to Panel VBD-S will not change the present operation of any of the systems or subsystems. The additional instrumentation will monitor but not provide any control function.

D. Due to the additional instrumentation being added to Panel VBD-S, Division II power source is required. This power will be fed from Critical Instrument and Control Panel (CCP), Bkr. No. 14 via Panel VBD-J. See NED Calculation 86-007 attached to DC 85-15D, for power sources and loading.

III. EFFECTS ON SAFETY

A. USAR Vol. IV, Section 10, Subsection 14.0 (Equipment and Floor Drainage Systems)

Technical Specification 3.6.C (Coolant Leakage)

B. The sump systems are designed to remove all waste liquids from their point of origin and transfer to suitable treatment or disposal areas. This includes both normal and radioactive drainage.

C. 1. System performance will not be affected as changes to the Panel VBD-S do not change the modes of operation of the equipment.

2. The instrumentation added in this Design Change will meet or exceed Category 2 criteria of Regulatory Guide 1.97.

3. a. Even though seismic classification for Category 2 criteria is not required, these standards shall be met for all field instrumentation added. The Control Room meters will also be seismically qualified.

   b. Tornado protection will not be specifically addressed in this Design Change other than to say that all installations will be at the 859 ft. elevation of the Reactor Building or 932 ft. elevation of the Control Building Control Room. Both areas should be considered relatively safe from tornados.

   c. This Design Change is installed inside the Control and Reactor Buildings so should not be susceptible to floods.

4. All materials installed in this Design Change shall be of the nonflammable grade. The electrical cable utilized will be flame retardant.

5. The instrumentation added in the field remains operable under normal and accident environments.

6. No missile protection is being provided in this Design Change.

7. The field instrumentation being added is designed to operate under HELB conditions but will not withstand a direct hit caused by pipe whip.

8. Electrical separation of Division I and Division II circuits will be maintained throughout for new installations.

9. Due to design specifications of this installation being Category II, redundancy is not required or being provided.

10. Physical separation criteria is not an issue for this Design Change.

11. Secondary containment integrity will be maintained as existing spare electrical circuits will be used so no core drills will be required.

12. Materials utilized in this Design Change will be compatible with existing and other new materials.

D. Due to the instrumentation being added not having any automatic control or interface with any safety system, there should be no increase in the probability of occurrences or the consequences of an accident or malfunction.

E. This Design Change should not create the possibility for an accident or malfunction of a different type than any previously evaluated in the USAR because safety systems are not affected and existing controls are not changed.

F. The margin of safety as defined in the Technical Specifications will not be reduced because this Design Change does not have an effect on safety equipment.

G. This Design Change does not violate the Technical Specifications because the specifications outlined will be met.

H. No change to the USAR will be required due to this Design Change.

IV. SUMMARY

The purpose of this Design Change is to increase station reliability and safety through better mam-machine interface by incorporating human factors principles to Control Room Panel VBD-S and by providing additional parameter information to the operator. The results of this safety analysis is that this Design Change does not create an unreviewed safety question, the probability of an accident, nor reduce the margin of safety as outlined in the Technical Specifications.

10CFR50.59 REPORTABILITY ANALYSIS

Proposed Activity (Include Applicable Number And Description):

I. USAR

1. Does this proposed activity constitute a change in the facility or procedures as described in the Updated Safety Analysis Report?

   Yes [X] No [ ]

   (If Yes, then the change is reportable under 10CFR50.59b and will be submitted by the Initiator to the Manager of the Nuclear Licensing and Safety Department for inclusion in the Annual Report.)

2. List the affected Section(s) of the USAR.

Volume	Section	Page/ Figure
IV	IX	IX-2-1
IV	X	X-14-2

II. TECHNICAL SPECIFICATIONS

1. Does this proposed activity involve a change in the Technical Specifications incorporated in the License?

   Yes [ ] No [X]

2. List the affected Section(s) of the Technical Specifications.

Section	Page

III. UNREVIEWED SAFETY QUESTION

1. Is this activity potentially an unreviewed safety question?

   Yes [ ] No [X]

   (A potential unreviewed safety question exists if the answer to 2.a., 2.b., or 2.c. below is Yes.)

10CFR50.59 REPORTABILITY ANALYSIS

III. (CONTINUED)

2. Unreviewed safety question evaluation - answer the following questions with a Yes or No and provide specific reasons justifying the decision:

   a. Is the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the Updated Safety Analysis Report increased?

   Yes ☐ No ☒ Because: This design change does not affect safety system operation so cannot interfere with existing safety system availability.

   b. Is the possibility of an accident or malfunction of a different type than any evaluated previously in the Updated Safety Analysis Report created?

   Yes ☐ No ☒ Because: This design change does not introduce any new safety hazards.

   c. Is the margin of safety, as defined, in the basis for any Technical Specification reduced?

   Yes ☐ No ☒ Because: The guidelines provided in the Technical Specifications shall be maintained.

IV. PRIOR NRC AUTHORIZATION

1. Is prior NRC authorization required?

   Yes ☐ No ☒

   (Prior NRC authorization is required if the answer to II. or III.1. is Yes.)

2. If the answer to IV.1. is Yes, then the change will be submitted by the Initiator to the Manager of the Nuclear Licensing and Safety Department to obtain NRC authorization prior to implementation of the subject change.

3. NRC authorization received: ☐ Reference: _____

   Licensing Department: _____ Date: _____

Performed By: Michael A. Parr Date: 2-14-86

G63

TURBINE BLDG. SUMP "1-P" HI-HI LEVEL	TURBINE BLDG. SUMP "1-T" HI-HI LEVEL	REACTOR BLDG. SUMP "1-A" HI-HI LEVEL	CONTROL BLDG. SUMP "1-L" HI-HI LEVEL
TURBINE BLDG. SUMP "1-Q" HI-HI LEVEL	TURBINE BLDG. SUMP "1-M" HI-HI LEVEL	REACTOR BLDG. SUMP "1-B" HI-HI LEVEL	CONTROL BLDG. MANHOLE #C-2 SUMP "1-X" HI-HI LEVEL
TURBINE BLDG. SUMP "1-R" HI-HI LEVEL	TURBINE BLDG. SUMP "1-U" HI-HI LEVEL	REACTOR BLDG. SUMP "1-C" HI-HI LEVEL	YARD MANHOLE #C-3 SUMP "1-W" HI-HI LEVEL
TURBINE BLDG. SUMP "1-S" HI-HI LEVEL	TURBINE BLDG. SUMP "1-V" HI-HI LEVEL	REACTOR BLDG. SUMP "1-D" HI-HI LEVEL	YARD MANHOLE #C-4 SUMP "1-Y" HI-HI LEVEL
DIESEL GEN. BLDG. SUMP DG-1 HI-HI LEVEL	DRYWELL FL. SUMP FILL-UP RATE HIGH	REACTOR BLDG. SUMP "1-E" HI-HI LEVEL	DRYWELL EQUIP. SUMP FILL-UP RATE HIGH
DIESEL GEN. BLDG. SUMP DG-2 HI-HI LEVEL	TROUBLE ARW-HVAC	REACTOR BLDG. SUMP "1-E" HI TEMP	ELEVATED RELEASE POINT SUMP HI LEVEL

DC 85-150

CONTROL ROOM PANEL VBD-5
ANNUNCIATOR 5-1
PRIOR TO MODIFICATION

Nebraska Public Power District

SKE-EE-59

0

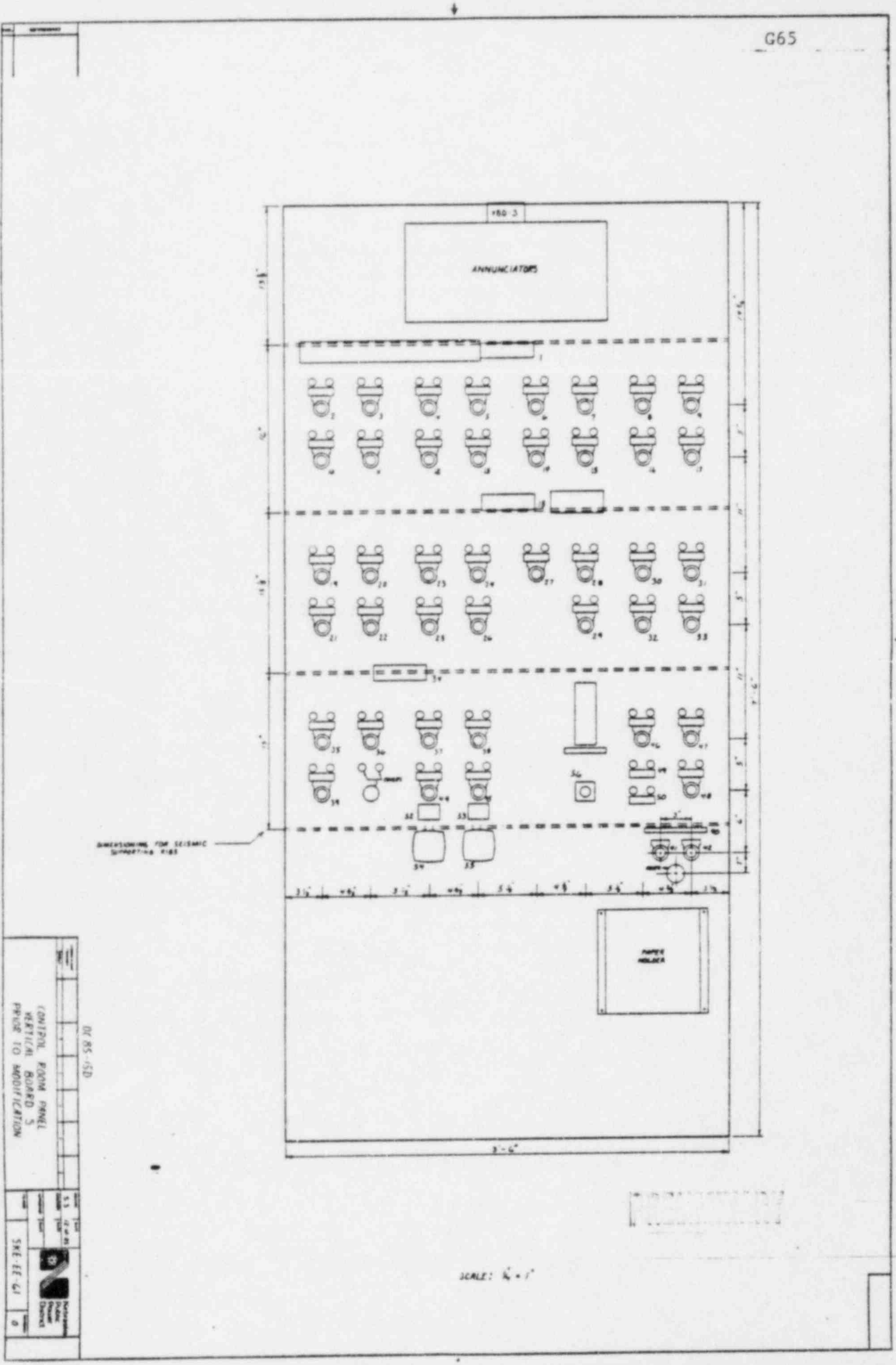
G64

DC 85-150

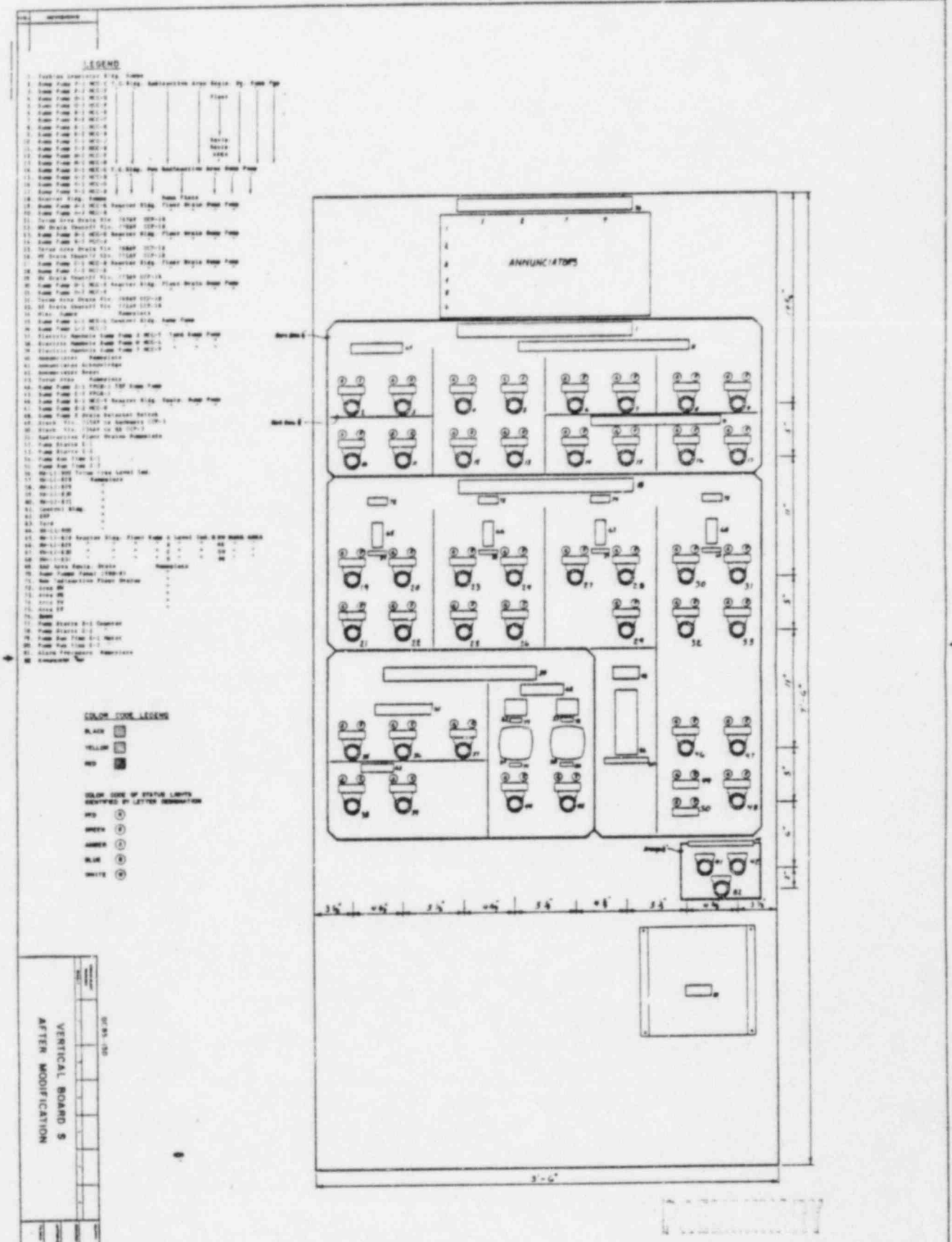
CONTROL ROOM PANEL VBD-5
ANNUNCIATOR 5-1
AFTER MODIFICATION

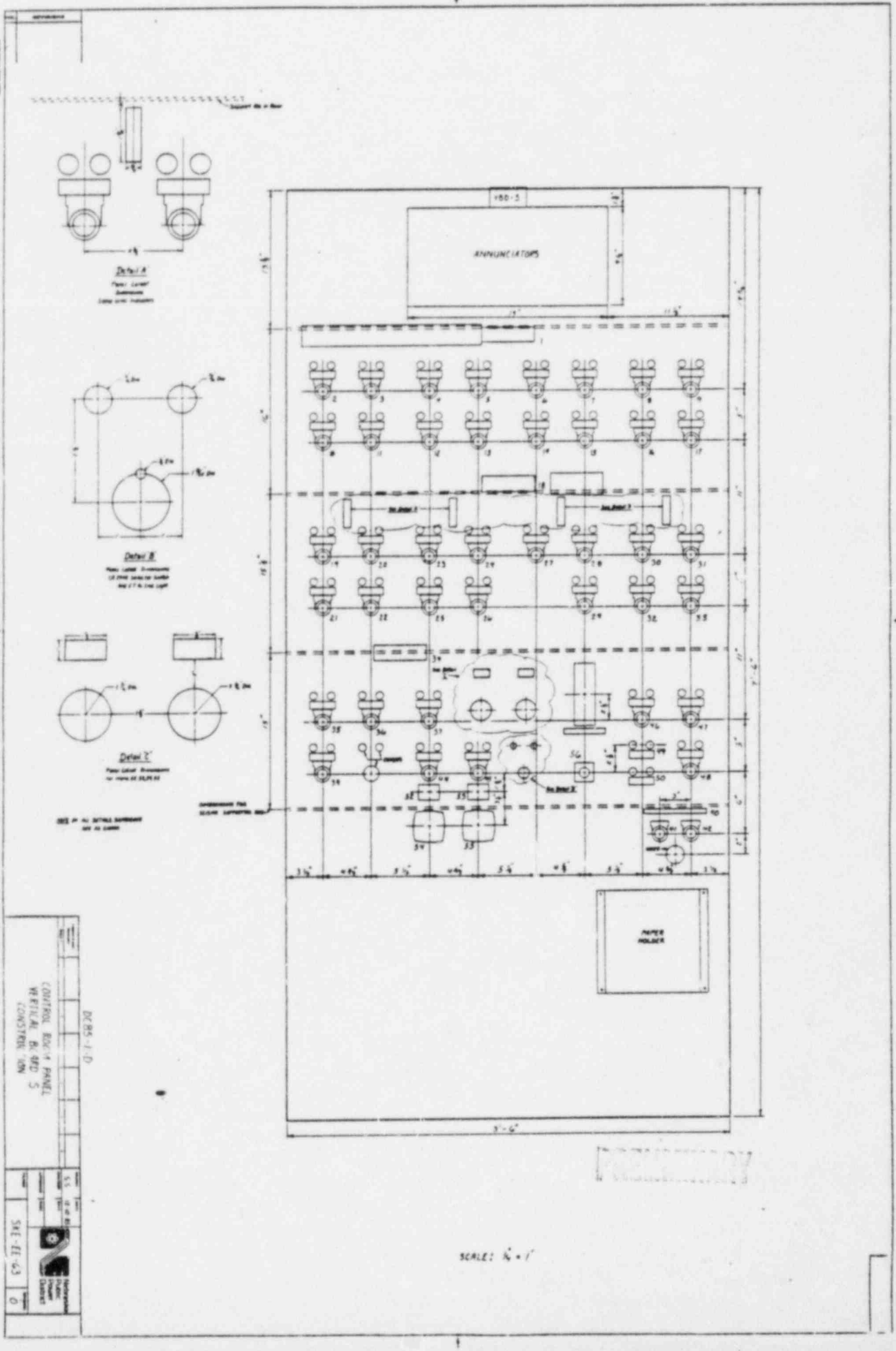
Nebraska Public Power District

SKE-EE-60 | 0

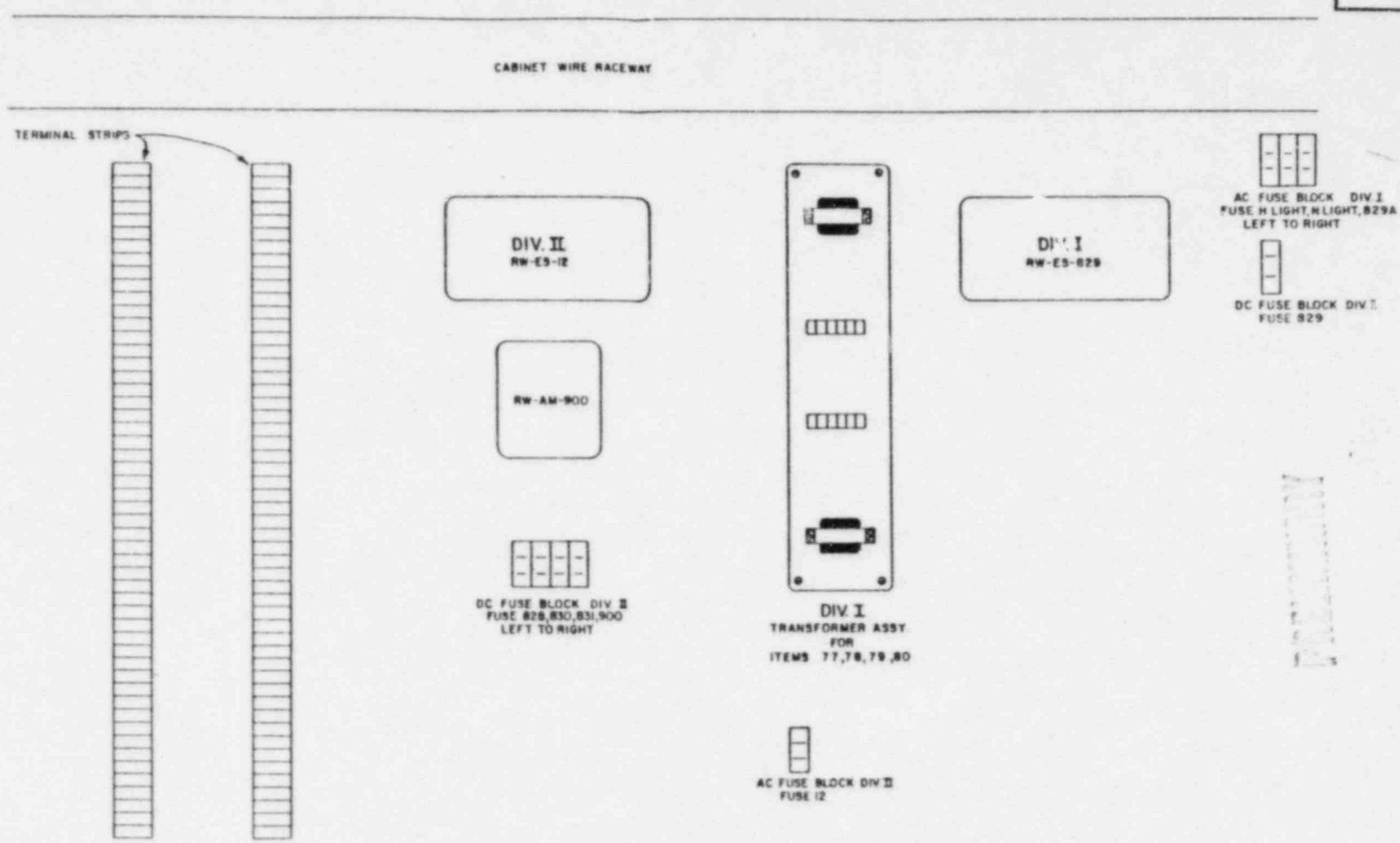


ANNUNCIATORS
DIMENSIONING FOR SEISMIC SUPPORTING RIBS
PAPER HOLDER
3'-4"
SCALE: ¼" = 1'
DC 85-150
CONTROL ROOM PANEL
VERTICAL BOARD 5
PRIOR TO MODIFICATION
SKE-EE-61


LEGEND
ANNUNCIATORS
COLOR CODE LEGEND
BLACK
YELLOW
RED
COLOR CODE OF STATUS LIGHTS IDENTIFIED BY LETTER DESIGNATION
RED
GREEN
AMBER
BLUE
WHITE
VERTICAL BOARD 5
AFTER MODIFICATION
SKE-EE-62
SCALE: 3/4" = 1'


ANNUNCIATORS
Detail A
Detail B
Detail C
SCALE: ¾" = 1'

G68



DC 85-15D

COOPER NUCLEAR STATION
REAR PANEL LAYOUT VBD-S
(Typical)

Nebraska Public Power District

SKE-EE-64

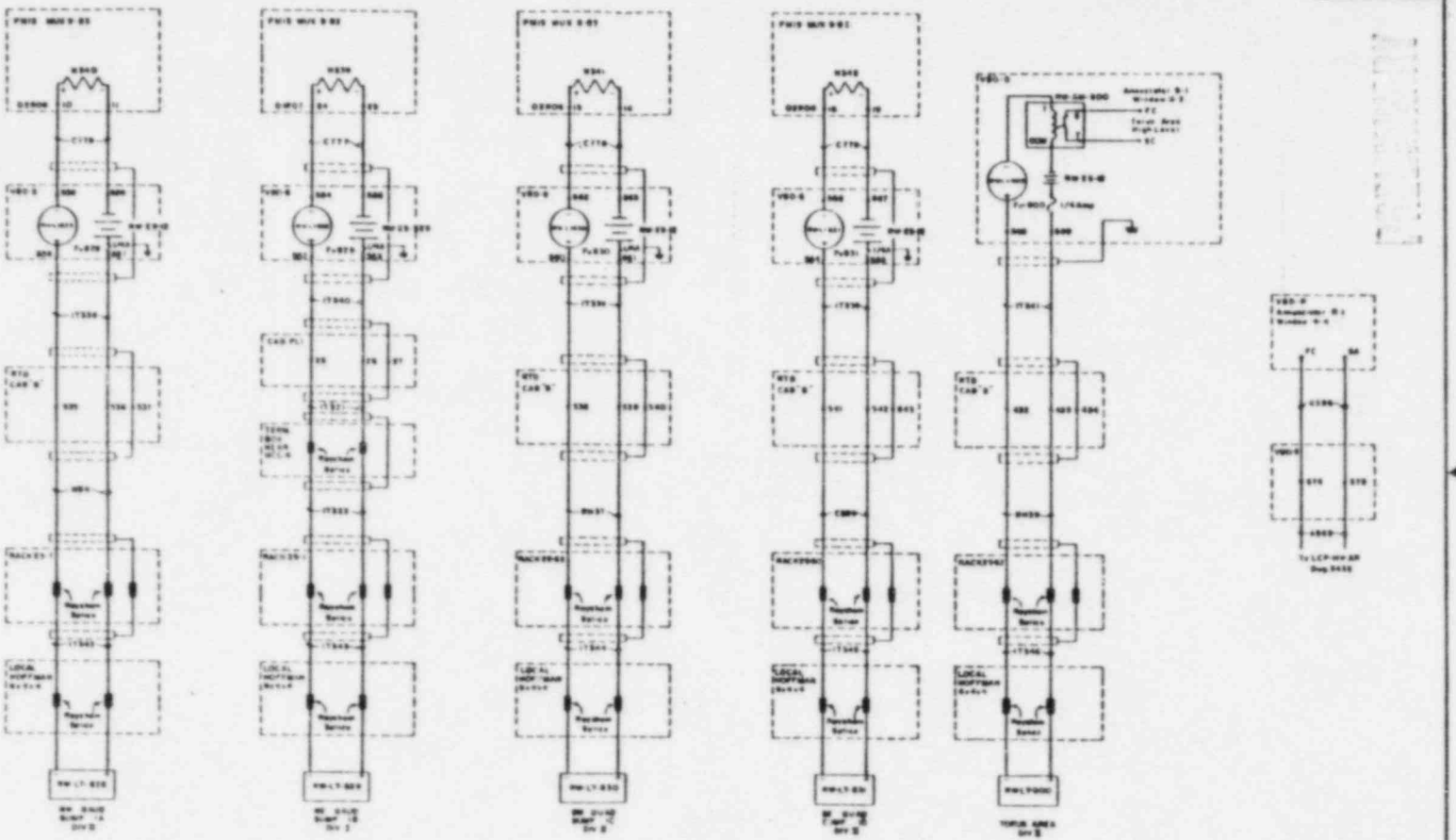
Revision 0

DR 1-17-86

REVISIONS

NO.

G69



DC-85-15D

COOPER NUCLEAR STATION
REACTOR BUILDING SUMP AND AREA
LEVEL TRANSMITTER WIRING DIAGRAM
(ELECTRICAL)

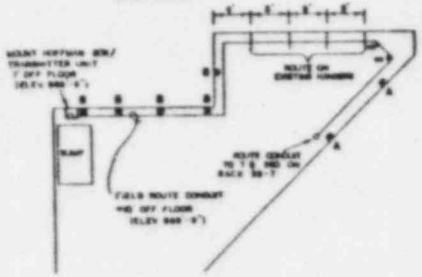
Nebraska Public Power District

SKE-EE-66

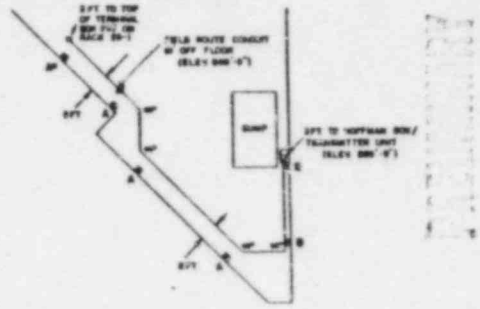
0

G70

N.W. QUAD

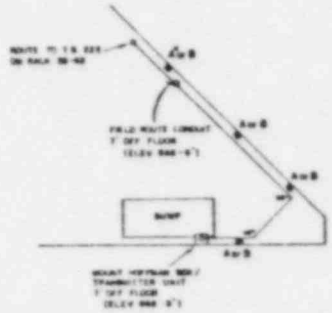


N.E. QUAD

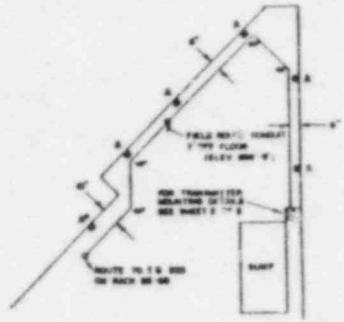


NOTES:

1. LOCATE HANGERS NEAR AREAS INDICATED.
2. MAINTAIN SPANS AS SPECIFIED ON HANGER SKETCHES.
3. AS-BUILT DIMENSIONS REQUIRED UPON COMPLETION.



S.W. QUAD



S.E. QUAD

DC 85-150

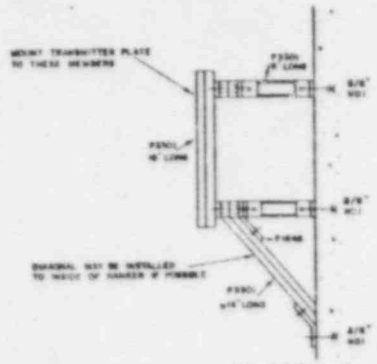
COOPER NUCLEAR STATION
SUMP LEVEL CONDUIT ROUTES
AND PROPOSED HANGERS

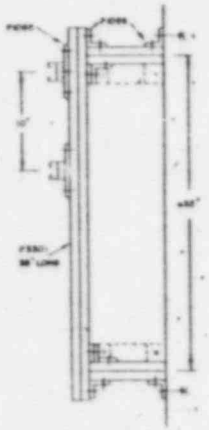
Nebraska Public Power District

SKE-EE-67 SHT. 1

0

G71

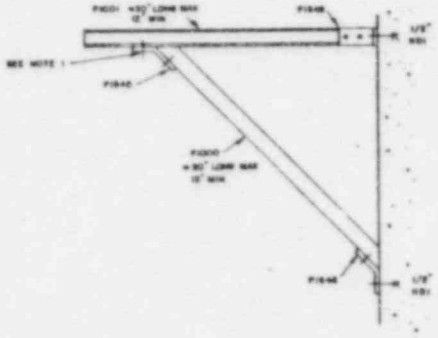




TRANSMITTER MOUNTING FOR S.E. QUAD

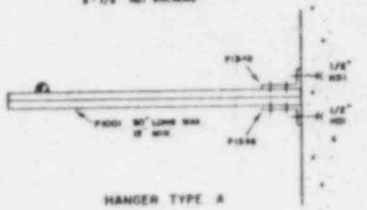
MATERIALS

NOTES



HANGER TYPE A*

MATERIALS



HANGER TYPE A

MATERIALS

NOTES

HANGER TYPE B

GENERAL NOTES

BOLT TORQUE

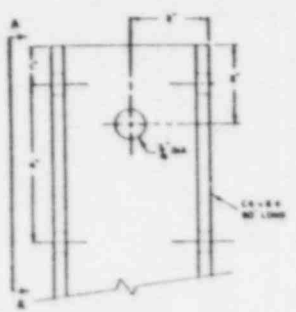
DC 85-150

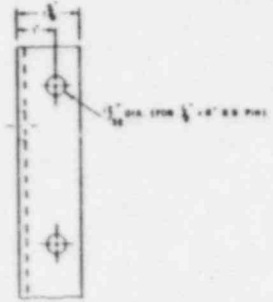
COOPER NUCLEAR STATION
HANGER DETAILS FOR SUMP
LEVEL TRANSMITTERS

Nebraska Public Power District

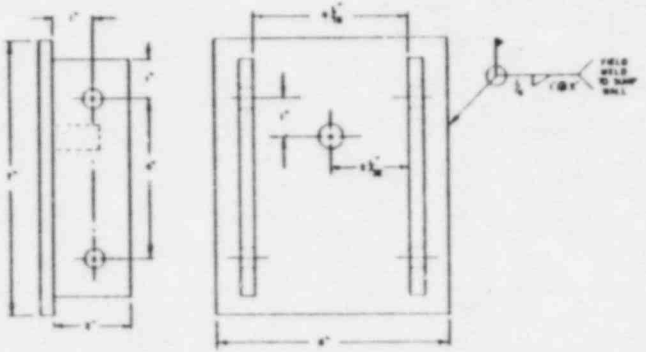
SKE-EE-67
SH. 2

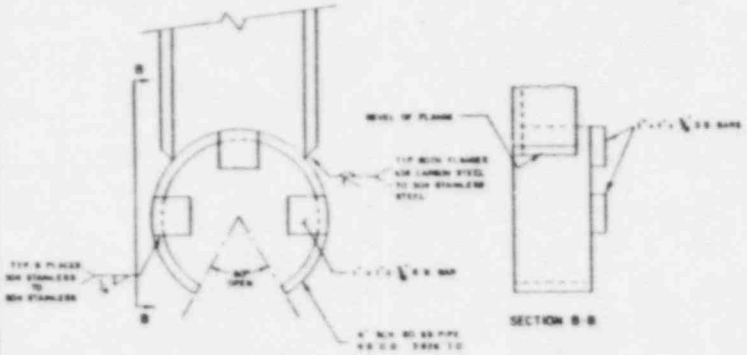
G72





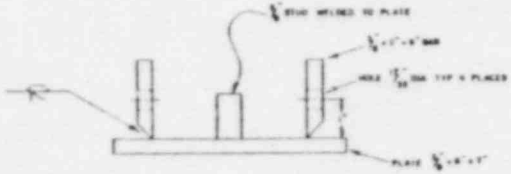
SECTION A-A





SECTION B-B

REMOVABLE SEAL MOUNT



SUMP WALL BRACKET

DC 85-150

COOPER NUCLEAR STATION REMOTE SEAL MOUNTS FOR SUMP LEVEL TRANSMITTERS		Nebraska Public Power District	
		SKE-EE-67	SH. 3
			0

G73

CALIBRATION DATA FOR RW-LT-828, 829, 830 & 831

INPUT " H_2O	DESIRED OUTPUT mA	CONTROL ROOM INDICATION & PMIS ft. in.
0	4	0' 0"
18	5.6	1' 6"
36	7.2	3' 0"
54	8.8	4' 6"
72	10.4	6' 0"
90	12	7' 6"
108	13.6	9' 0"
126	15.2	10' 6"
144	16.8	12' 0"
162	18.4	13' 6"
180	20	15' 0"

CALIBRATION DATA FOR RW-LT-900

INPUT " H_2O	DESIRED OUTPUT mA	CONTROL ROOM INDICATION ft. in.
0	4	0' 0"
20.4	5.6	1' 8"
40.8	7.2	3' 5"
61.2	8.8	5' 1"
81.6	10.4	6' 10"
102	12	8' 6"
122.4	13.6	10' 2"
142.8	15.2	11' 11"
163.2	16.8	13' 7"
183.6	18.4	15' 4"
204	20	17' 0"

* Alarm Module RW-AM-900 to Alarm at 4.2mA↑ or $2\frac{1}{2}$"

DC-85-15D

REVISIONS

NO.

COOPER NUCLEAR STATION

CALIBRATION DATA FOR LEVEL TRANSMITTERS

DRAWN: 1-15-86

CHECKED: 1-17-86

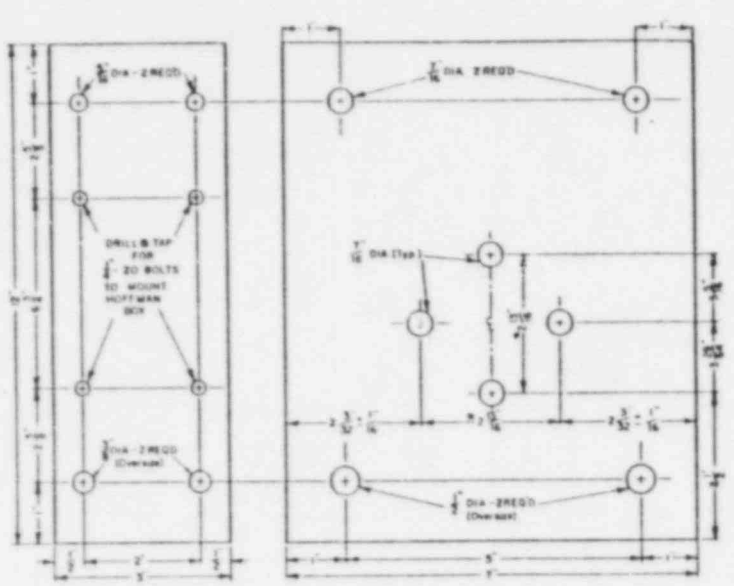
APPROVED

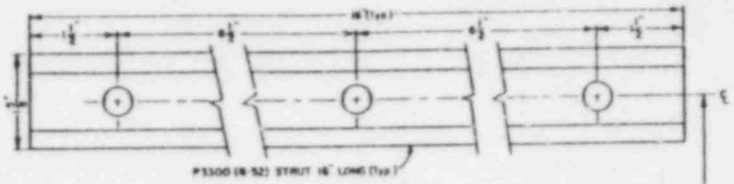
Nebraska Public Power District

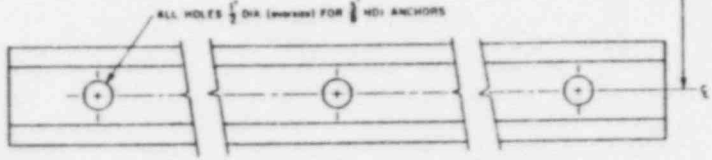
SKE-EE-75

REVISION 0

G74







MATERIAL LIST:
- 1 - PLATE 1/4" X 3' X 12' ASTM A36 or ASTM A516 Gr 70
- 1 - PLATE 1/4" X 1' X 12' ASTM A36 or ASTM A516 Gr 70
- 1 - HOFFMAN BOX 6' X 4' X 4'
- 8 - 1/4" X 3/4" BOLTS w/FLAT & LOCK WASHERS (ASTM A307)
- 4 - 1/4" STRUT NUTS
- 8 - 3/8" X 3/4" BOLTS w/FLAT & LOCK WASHERS (ASTM A307)
- 4 - 3/8" NUTS
- 4 - 3/8" STRUT NUTS
- 2 - 16' P3300 or B-52 STRUTS
- 6 - 3/8" HDI ANCHORS
- 6 - 3/8" X 3/4" BOLTS w/FLAT WASHERS (ASTM A307)

NOTE
TORQUE VALUES
1/4" - 6ft-lbs
3/8" - 19ft-lbs
3/8" - w HDI's 25ft-lbs

MARK BOLT HEADS AFTER PROPER TORQUE HAS BEEN ACHIEVED

DC 85-150

COOPER NUCLEAR STATION
MOUNTING PLATE
DIMENSIONS

Nebraska Public Power District

SKE-EE-76

0